



LEARNING TO FLY
TRAINING OPTIONS
APLENTY FOR NEW
BREED OF PILOTS
SUPPLEMENT

REGIONAL TEST

We take a ride on China's ARJ21 as Comac names November delivery date for long-delayed type **11**

WARNING SIGNS

MD-83 maintenance error at Las Vegas carrier Allegiant Air prompts safety calls to FAA **25**

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COVER IMAGE

The future of the British Army's Apache AH1 attack helicopters could be one of the questions answered in the UK's hotly-anticipated defence review **P26**



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Mavis Toh became the first foreign journalist to fly in Comac's ARJ21, hitching a ride on a non-commercial flight between Chengdu and Nanjing. The delayed regional jet is set to enter service with China's Chengdu Airlines in February 2016 (**P11**)



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Embraer to deliver its first Legacy 450 **P23**. Manufacturers optimistic that scope clause will be relaxed **P13**



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IMAGE OF THE WEEK

Five Chinese military aircraft are shown taking part in a fly-past over Tiananmen Square in Beijing on 3 September to commemorate 70 years since the end of the Second World War. The line-up consists of a KJ-2000 surveillance aircraft – based on the Ilyushin Il-76 – and four Chengdu J-10 fighters

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THE WEEK IN NUMBERS

25-30% Flightglobal dashboard

Azerbaijani cargo carrier Silk Way blamed China's economic slowdown for a decrease in its first-half freight tonnage

\$5.6m NASA

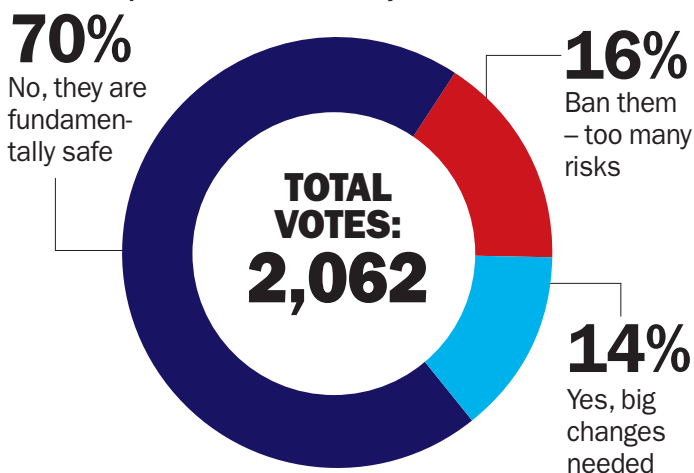
The cost to build a new launch command centre during upgrades of NASA's Wallops Island, Virginia flight range

17.3in Flightglobal dashboard

Passenger complaints led British Airways to fit its incoming 787-9s with seats half an inch wider than on its -8s

QUESTION OF THE WEEK

Last week, we asked: **After Shoreham disaster, do public airshows need safety overhaul?** You said:



This week, we ask: **Comac's ARJ21 service entry in 2016:**

- ☐ Crucial for Chinese airline ambitions
 - ☐ Type will struggle commercially
 - ☐ Irrelevant: C919 is real deal
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Spend it wisely

With only a few weeks left until the release of its new Strategic Defence and Security Review, the UK government knows it can't keep everyone in uniform happy, despite budget promises

It might barely have registered in the minds of the British public ahead of the May general election, but the future direction of the UK's armed forces is within weeks of again dominating the news agenda.

Collective jaws dropped five years ago, when the then-coalition government unveiled the findings of its Strategic Defence and Security Review (SDSR).

Against a backdrop of financial austerity, this forced an early demise for the BAE Systems Harrier GR9/9A ground-attack aircraft, and axed BAE's Nimrod MRA4, relegating an island nation's maritime patrol aircraft capability to a "nice-to-have". It also contained a baffling, and ultimately short-lived, proposal to make a late switch from the short take-off and vertical landing version of Lockheed Martin's Joint Strike Fighter to the carrier-variant F-35C.

With a new SDSR to reveal the government's latest five-year plan for defence next month, what surprises might be in store this time?

Will this be the SDSR where a plan to buy 138 Lightning IIs finally gets trimmed?

Defence ministers say this review is about capability, not cost-cutting, and a promise to maintain spending at NATO's suggested minimum of 2% of GDP was seen by many in the military as a small victory.

Speaking at the Royal Air Force's Waddington base in Lincolnshire in early July, Prime Minister David Cameron proclaimed: "Now we know how much we will spend; what matters next is how we spend it."

Wise words indeed, these were delivered at the UK's hub for operations involving surveillance aircraft and



How many of these to an F-35B?

remotely piloted air systems, giving a strong hint that this mission area might fly around fleet reductions.

Such emphasis on the current fight in the Middle East is in some ways a sideshow, as the UK's ability to perform high-end, large-scale warfighting has been gradually eroded over the last decade, with the Jaguar, Sea Harrier and Tornado F3 also having left use.

Today, the RAF has eight squadrons equipped with manned strike aircraft, and the looming transition from its offensive platform of choice – the Panavia Tornado GR4 – to a swing-role Eurofighter Typhoon and combat-capable F-35 appears fraught with schedule risk.

Will this be the SDSR where a fanciful-looking plan to buy 138 Lightning IIs finally gets trimmed? Funds could be diverted to a new maritime patrol aircraft; most likely the Boeing P-8A Poseidon, and to order AH-64E attack helicopters, rather than splash out a possible \$3 billion on a complex remanufacturing for its Apaches.

Given the surprise outcome of the 2010 review, it's anyone's guess. ■

See Features P26 & P30

Learning curves

Although delays to new aircraft programmes are not unexpected, an eight-year hiatus is at the extreme end of the range. That is where Chinese airframer Comac finds itself with the ARJ21 regional jet.

Work began on the country's first indigenously designed and produced commercial aircraft way back in 2002, with service entry for the twinjet originally envisaged in the 2007 timeframe.

But then deadlines slipped... and slipped... and slipped some more.

An inexperienced Comac found the multiple processes required to bring an aircraft to the market harder than it first thought.

Certification requirements posed a further challenge,

with both the airframer and the country's regulator, the Civil Aviation Administration of China (CAAC), forced to learn as they went along.

But to castigate Comac for the tardiness of its ARJ21 is to rather miss the point.

The experience that both the company and the CAAC have gained through the exercise is already being seen on the crucial C919 narrowbody. That design will compete directly with the Airbus A320 and Boeing 737, and so a smooth development is vital.

So, while an eight-year delay is undesirable, it may pay off in the long run. After all, the Chinese consider eight to be a lucky number. ■

See This Week P11



For more defence sector coverage, pay a visit to our dedicated landing page: flightglobal.com/defence



BRIEFING

AEROFLOT GETS GO-AHEAD FOR TRANSAERO DEAL

AIRLINES Russia's government has given flag carrier Aeroflot the green light to take over the country's second-largest airline, Transaero. A statement from loss-making Transaero confirms that the acquisition has been approved "in the interests of the development of commercial aviation", and to create one of the largest airline groups in the world. Flightglobal's Fleets Analyzer database shows that Transaero has 98 aircraft in service, while Aeroflot has 163.

MALAYSIA TAKES OFF WITH NEW IDENTITY

BRANDING Malaysia Airlines on 1 September began operations under its new corporate entity, Malaysia Airlines Berhad. This comes after the company was granted a new air operator's certificate by Malaysia's Department of Civil Aviation on 28 August. The change is a major part of chief executive Christoph Mueller's turnaround plan for the carrier, which he hopes will break even in 2018.

SELEX SELECTED TO PROTECT BRAZILIAN LYNX

MODERNISATION Selex ES has been contracted to provide its Sage electronic support measures system, a defensive aids suite controller and third-party countermeasures dispensing equipment as part of an upgrade to the Brazilian navy's AgustaWestland Lynx 21A helicopters. The service earlier this year awarded the airframer a contract worth more than \$160 million to upgrade eight aircraft, with the work also to include installing new LHTEC CTS800-4N engines.

NEW POLISH FIRM TO CUT TEETH ON A350

SUPPLY CHAIN Airbus and Stelia Aerospace are to source some components for the A350 from a newly-created Polish company named Azura Polska, with the business to value around \$45 million. The Lodz-based firm is a subsidiary of Nimrod Group, which includes business units Detampel and ESM and which specialises in sheet metal work, including nozzles and heat exchangers.

737 MAX TO ARRIVE EARLY IN ALASKA

DELIVERY Alaska Airlines is now planning to take early delivery of its first Boeing 737 Max 8 in late 2017, says its vice-president of capacity planning, John Kirby. The carrier had previously anticipated receiving its first example in 2018, but "Boeing has indicated that it may be ready a little early," Kirby says. The Seattle-based airline has placed firm orders for 20 737 Max 8s and 17 Max 9s, Flightglobal's Fleets Analyzer database shows.

REJECTED JSTARS RECAP BIDDER REVEALED

CONTEST Huntsville, Alabama-based Intuitive Research and Technology Corporation has been revealed as the fourth contender recently eliminated from the US Air Force's Joint Surveillance Target Attack Radar System Recapitalisation (JSTARS Recap) programme, having teamed with Sierra Nevada Corporation. Boeing, Lockheed Martin and Northrop Grumman remain in contention to replace the US Air Force's Boeing 707-based Northrop E-8Cs.

NIGERIAN TRANSPORT CRASH KILLS SEVEN

ACCIDENT Two crew members and five passengers were killed when a Nigerian air force Fairchild Dornier 228 transport crashed soon after taking off from Kaduna airport for Abuja on 29 August. Flightglobal's Fleets Analyzer database records destroyed aircraft NAF030 as having been built in 1992. Its loss reduces the service's inventory of the twin-turboprop type to six aircraft.



French forces have been conducting searches around Reunion

INVESTIGATION DAVID KAMINSKI-MORROW LONDON

France certain on MH370 wreckage

Investigators confirm that flaperon component washed up on island of Reunion is from missing Malaysia Airlines jet

French authorities have confirmed that aircraft wreckage recovered in July from the island of Reunion is from Malaysia Airlines flight MH370.

Using an endoscope inside the flaperon, investigators were able to discern three numbers that tied it to Airbus Defence & Space in Seville, Spain. That division of Airbus Group produces the Boeing 777 part as a subcontractor to the US airframer.

Subsequently, relevant serial numbers were matched with those of the missing aircraft.

"Thus, it is now possible to state with certainty that the flaperon discovered in Reunion on 29 July 2015 corresponds to flight MH370," reads a French justice ministry statement.

The Malaysia Airlines flight carrying 239 people disappeared en route between Kuala Lumpur and Beijing in March 2014. Despite extensive searches the crash site has not been located.

German oceanographic analysis, meanwhile, indicates that the component probably originated from the eastern equatorial Indian Ocean.

But the Geomar Helmholtz Centre for Ocean Research, based in Kiel, cautions that there are "very large" uncertainties which would work against attempts to

narrow the area further.

Oceanographers from Geomar have attempted to model the drift of the component using computers supported by observational data.

This has involved reverse-tracking nearly 2 million virtual particles across the 16 months between flight MH370's disappearance and the discovery of the flaperon.

Possible origination points for the flaperon, calculated by the model, extend from the western coast of Sumatra and Java. "The results show that the crash site could be found further north than previously thought," the organisation states.

All the virtual particles were traced to an area equatorward of latitude 30°S. "Our findings therefore show that the ongoing search southwest of Australia might be too far south," says Geomar's Jonathan Durgadoo.

But the organisation adds that, while the model is consistent with previous communications analysis which put MH370's location in the eastern Indian Ocean, the scale of the uncertainty makes localising the site "difficult".

Geomar says additional MH370 debris is needed to generate more precise information. It adds that it intends to explore a possible refinement of the analysis by examining wind and wave data. ■



Lightning strikes
Hill AFB as first
F-35s touch down
THIS WEEK P10

THIS WEEK

ROTORCRAFT BARTOSZ GLOWACKI KIELCE

Bidders seek pole position for Warsaw attack contest

Helicopter manufacturers detail deals with Polish industry ahead of Mil Mi-24 replacement

Prospective bidders for Poland's nascent requirement to replace its fleet of Mil Mi-24 attack helicopters have been jostling for front-runner status.

Warsaw has yet to launch a tender for the contest, but last year invited early expressions of interest under an initiative dubbed Project Kruk, part of a broad modernisation of its armed forces.

Despite the lack of a request for proposals, and uncertainty caused by forthcoming parliamentary elections, manufacturers have been lining up deals with local industry and performing aircraft demonstrations in the past weeks.

Two potential candidates – the Airbus Helicopters Tiger HAD and Turkish Aerospace Industries (TAI) T129 ATAK – were put through their paces in front of Polish defence officials in the final week of August.

In addition, both helicopters were on static display at the recent MSPO defence show, held in the city of Kielce between 1-4 September, alongside Boeing's AH-64E Apache.

TAI used the event to unveil a number of memoranda of understanding with local partners including air force research organi-



The Tiger HAD has flown for Polish officials and appeared at MSPO

sation ITWL, maintenance firm WZL-1, and munitions manufacturer Mesko.

"Our approach is not only selling the helicopters, but we are planning to provide long-term industrial partnership," Görkem Bilgi, manager of TAI's helicopter group says.

Bilgi has also not ruled out the creation of a Polish final assembly line for the type, which could serve as a regional hub, producing T129s for other central European nations. Airbus Helicopters, meanwhile, says it can offer industrial participation for Poland in all Airbus Group programmes.

"We are very comfortable moving forward with the Tiger, that we will have a number of projects that will be very convincing. More than would be requested as an offset," says chief executive Guillaume Faury.

Boeing, too, detailed an agreement with Polish defence firm PGZ committing the pair to collaborate on the modernisation efforts of the country's armed forces.

Bell Helicopter also plans to bid its AH-1Z attack helicopter and will set up a team with local partners in the coming months. ■

Additional reporting by Dominic Perry in London

PROCUREMENT DOMINIC PERRY LONDON

Airbus bullish over Caracal contract despite legal challenge

Airbus Helicopters remains confident of signing a final contract with Poland by year-end covering the country's purchase of 50 H225M Caracals for all three branches of its armed forces.

The manufacturer was shortlisted for the deal in April and the acquisition has now been cleared by Warsaw's defence ministry. Negotiations between the manufacturer and the ministry of economy covering a proposed offset package will begin shortly, says Airbus Helicopters chief executive

Guillaume Faury. "It is the only remaining part of the contract to be finalised," he says. "We have reached an important milestone."

Although the talks with the ministry are yet to begin, Faury anticipates the contract being signed off by the end of 2015.

Airbus Helicopters has proposed a number of initiatives with Polish industry for the deal, including the establishment of a final assembly line for the H225M in the city of Lodz.

There remains, however, one further hurdle for Airbus Helicopters to

clear in the form of a court case instigated by AgustaWestland's Polish subsidiary PZL Swidnik, which had proposed the AW149 for the requirement. Alleging multiple breaches of the tender process, it hopes to have the contract award annulled.

Faury remains unmoved by the legal threat, however: "The Ministry of National Defence and Airbus Helicopters have been professional and have worked within the laws on tenders and we are confident that we will move forward with or without the claims of AgustaWestland." ■

WEBSITE

Flightglobal.com shows off raft of improvements

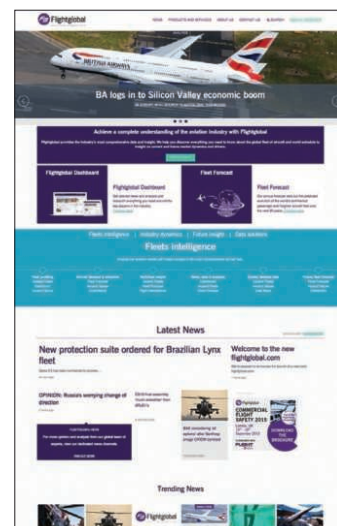
We are pleased to announce the launch of a new-look flightglobal.com, with the site having gone live on 2 September.

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- an upgraded search function; and
- article pages that now offer you additional data insight based on your chosen topic. ■



Streamlined news channels make finding content easier



TRAINING CRAIG HOYLE LONDON

Lockheed in a class of its own

Lockheed Martin hopes to increase the popularity of its C-130J tactical transport and in-development LM-100J commercial freighter by establishing a new international training centre for the types.

To be set up at its Marietta production site in Georgia, the centre is scheduled to open in the first quarter of 2018, says Vic Torla, business director for training solutions at Lockheed's Mission Systems and Training business unit.

"Demand has been increasing for some time," says Torla, noting that the US Air Force's capacity to train international C-130J crews at Little Rock AFB in Arkansas is reducing as it shifts more towards using new-generation Hercules.

Likely to deliver around 2,000h of pilot instruction per year using one simulator, the cen-

tre will support initial pilot qualification tasks, plus mission, refresher and instructor training services, Torla says. The reconfigurable device will be used by customers of both models, with the main difference being the omission of military mission system equipment from the LM-100J.

"With the launch of the LM-100J it's the perfect time to accommodate both kinds of operator," Torla says. Construction work on a simulator building will start in 2016, and the company expects to see a 50:50 mix between military and commercial users.

Lockheed launched development of the LM-100J after signing a letter of agreement with Ireland-based ASL Aviation last year. The company plans to acquire 10 examples, for operation by its Safair subsidiary in South Africa. ■



The arrival of the stealthy type marks a new era for the USAF

US Air Force

COMBAT AIRCRAFT JAMES DREW WASHINGTON DC

Lightning strikes Hill AFB as first F-35s touch down

The US Air Force's first two combat-coded Lockheed Martin F-35A Lightning IIs have touched down at Hill AFB in Utah, marking a new era in aviation for the base's active-duty 388th and reserve 419th fighter wings, which are to receive 70 more jets through 2019.

Hill has been preparing for the arrival of the Joint Strike Fighters, including a \$120 million investment in the base, ever since it was selected in 2013 to host the service's first combat F-35 squadron.

On 2 September the first two aircraft – AF-77 and AF-78 – finally landed.

The F-35s were flown from Lockheed's F-35 production plant in Fort Worth, Texas, by Col David Lyons, commander of the 388th fighter wing, and Lt Col Yosef Morris, director of operations for the 34th Fighter Squadron, to which the first two examples have been allocated.

Activated in July, that formation intends to declare initial operational capability with 15 aircraft by August 2016. ■



Lockheed Martin

Development of the commercial LM-100J was launched last year

TECHNOLOGY JAMES DREW WASHINGTON DC

Northrop counters BAE's CIRCUM bid

Illinois firm selected ahead of British rival to develop and produce US military's next-generation self-protection system

Northrop Grumman has been selected to develop and produce a next-generation self-protection system for the US military, after defeating a rival BAE Systems bid for the US Army's common infrared countermeasure (CIRCUM) programme.

The company has received a \$35 million contract from the army for the engineering and manufacturing development phase, to run to October 2017. Announced on 28 August, it also contains options for low-rate initial production in 2017 and 2018.

According to a development schedule contained within the service's fiscal year 2016 budget plan, a critical design review is planned for mid-2016, and an operational test and evaluation effort will start in late 2018.

Following the selection, Northrop will become the primary supplier of future laser-based infrared countermeasure systems for rotary-wing, tiltrotor and small fixed-wing aircraft types across the Department of Defense, says the army, which has previously relied on BAE's

advanced threat infrared countermeasures system.

The winning CIRCUM team is comprised of Northrop Land & Self Protection Systems of Rolling Meadows, Illinois; Daylight Solutions of San Diego, California; and Selex ES of Edinburgh, Scotland.

The Northrop solution packages Daylight's expertise in quantum cascade laser technology with Selex's Eclipse pointer/tracker, with its system to also integrate BAE's existing common missile warning system.

BAE has not ruled out a bid protest through the US Government Accountability Office, and says it is waiting to receive a post-award briefing from the army contracting office. "We are considering all of our options," it says.

Initial work centres on the Sikorsky UH-60 Black Hawk, which will be followed by the Boeing AH-64 Apache. At present, 10 aircraft types are touted to receive the CIRCUM system.

Future prospects for the system include the potential for export sales. ■



Advisory on cowl door latching after A319 incident
AIR TRANSPORT P12

PROGRAMME MAVIS TOH SHANGHAI

Comac's long march to ARJ21 delivery

Some 13 years after work began, Chinese airframer's first indigenous commercial aircraft is finally nearing service entry

It has been a long time in the making, but finally, the Comac ARJ21 – China's first indigenously designed and built commercial aircraft – is nearing service entry.

The Chinese airframer is targeting 28 November to hand over the first production example of the regional jet to launch customer Chengdu Airlines. It's a date heavy with significance for the programme, given that it first took to the skies on the same day in 2008.

The fact that its maiden sortie came some seven years ago – work on the ARJ21 actually began in 2002 – says much about the state of the programme and the steep learning curves encountered by the inexperienced Comac.

However, that the ARJ21 is some eight years behind schedule is almost to miss the point. Comac is clear that development of the regional jet has always been about gaining experience – in design, development, supplier management, systems integration, and, for both it and the country's regulator, the Civil Aviation Administration of China (CAAC), certification.

In other words, all the skills required for future programmes, with the key C919 narrowbody next in line.

Comac is already feeling the benefit of that experience. Chief engineer Jiang Liping, speaking during an interview in Shanghai, said final assembly of the C919 is progressing much more smoothly than on the ARJ21.

These days, the airframer is far more aware of the need to control



Work on the ARJ21 actually began in 2002, with its development some eight years behind schedule

processes carefully and provide precise specifications to suppliers, she acknowledges.

While final assembly of the ARJ21's airframe took about six months, it took a little over half that time to bring the C919 together. And the complex wing-to-body join on the narrowbody took only 25 days.

DIFFERENT PROCESS

"This is because we had better process control and took more measurements once parts are delivered, to make sure the parts are to standard," she adds.

Jiang also says that the CAAC has been more involved with the C919 at an earlier stage than with the regional jet, which should enable a quicker certification process.

"The ARJ21 was the first experience for us and also for the CAAC. Things are different now."

On the ARJ21, that process took eight years from first flight and even now appears incomplete:

nine months after gaining Chinese approval, Comac appears to have set aside plans for Western certification of the regional jet.

Sources close to the discussions say the Chinese manufacturer is no longer in direct talks with the US Federal Aviation Administration, and the focus is now on putting the aircraft into service initially in China, with parts of Asia and Africa to follow. It will revisit Western certification only after the jet reaches maturity in five to 10 years.

The US agency has been conducting a shadow certification process on the ARJ21 to ensure that the CAAC keeps to FAA standards.

Nonetheless, Chinese validation is sufficient for now as the overwhelming majority of the 315 commitments for the ARJ21 are from indigenous airlines and lessors.

Still, Comac has yet to secure a production certificate for the programme. It is also working on changes to the aircraft in areas it says do not relate to the safety of the jet, but could affect its operational efficiency.

These include improving how the ARJ21's anti-icing system functions in the event of single-engine operation, as well changes to the aircraft's warning systems.

When *Flight International* took a 2h, non-commercial flight aboard aircraft 105 from Chengdu to Nanjing in late August, the cabin interior of the 78-seat aircraft was in excellent condition. Although cabin noise was notice-

able during flight, especially toward the aft section of cabin, near its General Electric CF34-10A powerplants, the average passenger is unlikely to notice any difference over their experience in a typical regional jet.

STRETCHED VERSION

In addition, Comac's vice-chief designer Zhao Keliang says it is studying ways to reduce the weight of the aircraft since the first few ARJ21s off the line are "a few hundred kilograms overweight".

A business jet variant should follow in 2016, and a stretched model with capacity for 105-110 passengers is also on the cards. Future improvements over the next two to three years would be to target the competitive advantage enjoyed by the next-generation of regional jets such as the Embraer E-Jet E2 family and the Mitsubishi MRJ.

In the near term, Comac's challenge will be to prove that it is able to provide reliable after-sales support for ARJ21 operators. Passengers too must accept the type.

But within Comac there is a sense of pride and achievement as the ARJ21 nears delivery and the C919 prepares for its roll-out.

Employees are realistic about the ARJ21's flawed birth, and know the success of the C919 is more important.

After all, the ARJ21 was never really an end in itself, but a means to one. ■



Comac believes the ARJ21 experience will aid the C919 process

DIRECTIVE

DAVID KAMINSKI-MORROW LONDON

EASA orders ice risk update to MD-80 manuals

Amendments to Boeing MD-80 flight manuals to provide pilots with greater awareness of the threat posed by engine icing have been ordered by Europe's safety regulator.

Approved manuals for the type do not contain specific procedures covering the onset of erroneous engine pressure ratio readings – and the response generated from the auto-throttle – caused by icing.

French investigators believe this situation led to the gradual, and undetected, deterioration in airspeed by a Swiftair MD-83 which subsequently stalled and crashed in Mali in July 2014.

The European Aviation Safety Agency is now requiring an update to the flight manuals within 30 days. It states that crews should monitor airspeed and thrust, particularly in the vicinity of convective weather, and check the correlation of engine speed with the engine pressure ratio.

If erroneous pressure ratio data is confirmed, the agency states, the abnormal procedure for such unreliable indications should be applied.

EASA's directive also covers certain models of Boeing 727. ■

FLEET

Emirates marks milestones with delivery of three 777s

Dubai-based carrier accepts two -300ERs and a Freighter on same day, plus latest A380

On 3 September Emirates Airline celebrated the arrival in its fleet of four new widebody aircraft, including a milestone delivery of Boeing 777s.

The handover of two 777-300ERs and a 777 Freighter marked the first time in 15 years that the US airframer has delivered three 777s to one customer in a single day, and brought the total number of 777s to enter Emirates' fleet to 150.

The carrier now operates 147 of the Boeing twinjets, with three older examples having been retired. Boeing says that the Dubai-

based airline is also the only carrier to have operated all six variants of the widebody twin.

Meanwhile, Emirates also received another Airbus A380 – its 66th example of the type.

Emirates Airline president Sir Tim Clark says: "Our long-standing commitments to both aircraft programmes continue to support jobs and innovation across the aerospace manufacturing supply chain around the world. We will continue to work closely with both manufacturers to raise the bar on operational efficiency and onboard product features."

The maiden passenger flights for the two 777-300ERs were between Dubai and Kuwait and Mumbai, while the new A380 operated a service on the Dubai-Düsseldorf route. The 777 Freighter flew from Seattle to Hong Kong to pick up 103t of cargo.

Emirates has now received 14 new jets in 2015 – nine A380s, four 777-300ERs and one 777 Freighter. In the same period, the airline retired four A340-500s, three A330-200s and one 777-200.

Its order book includes 46 777-300ERs, 150 777-9Xs and -8Xs, and 74 A380s. ■



Boeing says it is 15 years since it delivered three of its big twins to a single customer in one day

SAFETY DAVID KAMINSKI-MORROW LONDON

Advisory on cowl door latching after A319 incident

Europe's safety authority is advising aircraft operators to notify pilots formally of any maintenance work immediately prior to their flight involving opening or closing of engine fan cowl doors.

The advisory follows the conclusion of an inquiry into the loss of cowl doors from a British Airways Airbus A319, which seriously damaged the aircraft.

Cowl door loss – usually attributed to a failure to check that the doors are securely latched – has been a long-running problem on

various aircraft types, but primarily the A320 family.

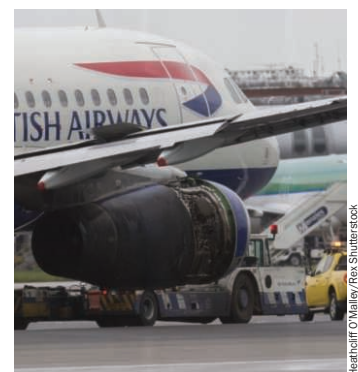
"There has been much effort to improve [unlatched cowl] detectability to [prevent] such events," says the European Aviation Safety Agency in a bulletin. "However, at this time, all measures rely largely upon the human factor that an unsecured fan cowl door [is] detected by ground personnel or the flight crew during walk-around."

EASA is recommending that aircraft maintenance manuals be amended to record any cowl

opening and closing procedures in the aircraft's logbook.

Such an entry, it says, would "improve flight crew awareness" and heighten the chances of the pilots been able to verify the doors' proper closure.

EASA adds that operators should amend pre-departure procedures to ensure that all maintenance actions which involved opening, closing or replacing the doors are brought to the crew's attention before the aircraft's next flight. ■



A BA twinjet was damaged by cowl door loss in May 2013



ETOPS approval
near for six Virgin
America A320s
AIR TRANSPORT P14

Pilot contracts at Delta limit
its regional fleet to aircraft
with no more than 76 seats



AirTeamImages

REGULATION EDWARD RUSSELL LAS VEGAS

Manufacturers bullish on scope relief

Airframers say lifting of weight and seat limitations will pave way for E175-E2 and MRJ90 operations at US mainline carriers

Embraer and Mitsubishi Aircraft continue to maintain their optimistic stance on the prospect of scope relief at the US mainline carriers that is a prerequisite to the introduction of their next-generation regional jets in the USA.

“Historically, scope clause has continuously relaxed,” said Hideyuki Kamiya, director head of strategic marketing at Mitsubishi, at the Boyd International Aviation Forecast Summit in Las Vegas on 2 September.

He anticipates this trend to continue for the next generation of aircraft, which exceed the weight

and capacity limits mandated by the current scope clause.

Pilot contracts at American Airlines, Delta Air Lines and United Airlines all limit their regional fleets to aircraft with no more than 76 seats, plus a few larger exceptions under grandfather rights, and a maximum take-off weight (MTOW) of 39,000kg (86,000lb). They also include caps on the number of aircraft allowed in feeder fleets.

However, the Embraer E175-E2 and Mitsubishi MRJ90 have MTOWs of over 44,600kg and 39,600kg, respectively. They are also slightly larger than the exist-

ing 76-seat Bombardier CRJ900 and E175.

The weight increase is driven by new Pratt & Whitney geared turbofan (GTF) engines that, while more efficient and powerful, are also heavier than current-generation powerplants.

“The GTF engine is a large engine,” says Kamiya. “After they relax the scope clause weight, the MRJ can operate. We think that the weight limitation will come soon.”

His comments are echoed by Rodrigo Silva e Souza, vice-president of marketing at Embraer. “I think [scope relief] will happen at a certain point in time and I think

it will happen for the three mainline carriers,” he says.

“I think the scope clause has not been relaxed because there would be no product available that would benefit from that.”

Entry into service for the MRJ90 is expected in 2017 with Utah-based SkyWest scheduled to take its first aircraft in late 2017 and St Louis-based Trans States Airlines following in early 2018.

The E175-E2, the last of Embraer’s E2 family to arrive, is due in 2020.

US mainline carriers have yet to put in front of pilots a contract with changes to either weight or seat counts on large regional jets. A proposal rejected by Delta Air Lines flight crews in June only sought to increase the total number of 76-seat regional aircraft in its fleet, with no changes to the other limits.

However, the agreement included a clause permitting changes from December 2018.

United’s pilot contract becomes amendable in January 2017 and American’s in January 2020.

SkyWest has placed firm orders for 100 E175-E2s and 100 MRJ90s, and Trans States has a firm commitment for 50 MRJ90s, alongside a letter of intent for 50 E175-E2s. ■

DEVELOPMENT MAVIS TOH SINGAPORE

October first flight nears as tests confirm MRJ’s strength

Mitsubishi Aircraft says the static strength tests it has conducted on its MRJ confirm that the regional jet is structurally ready for a “safe first flight”.

Evaluations performed to date include wing-up deflection and fuselage pressurisation, says executive chief engineer Nobuo Kishi.

The Japanese airframer says the MRJ is set to make its first flight in the second half of October, with a more precise timeframe to be released closer to the time. The exact

date will be announced the day before the event, it says.

Kishi adds that the primary objective of the first flight, scheduled to last around 1h, will be to confirm the aircraft’s basic handling characteristics during selected flight phases.

During the sortie, moving parts such as its landing gear and flaps will remain in a fixed position. Data gained during the flight will allow Mitsubishi to expand the flight envelope, it says.

Flight-test prototype FTA1 has

undergone taxi tests, while FTA2 has been performing ground vibration trials. Between July and August, modifications to the aircraft were also made according to test feedback, and technical data was checked, says Mitsubishi.

The programme is using five flight-test aircraft for its certification effort.

Mitsubishi has received firm orders for 223 MRJs, as well as options and purchase rights for a further 184 examples. ■



OPERATIONS EDWARD RUSSELL LAS VEGAS

ETOPS approval near for six Virgin America A320s

Virgin America is in the final stages of obtaining extended twin-engine operations (ETOPS) approval to allow its Airbus A320s to operate services to Hawaii from later this year.

The airline's chief executive Dave Cush says he expects the carrier to receive US Federal Aviation Administration certification for the move later this month.

Virgin America will eventually operate six ETOPS-approved A320s on Hawaii routes, with the carrier having already taken delivery of two examples, said Cush, speaking at an industry event in Las Vegas, Nevada.

It will start daily flights between



A319 operator Virgin is keen to take larger Airbus narrowbodies

San Francisco and Honolulu from 2 November, and add a daily service from the city to Kahului, Maui, from 3 December.

With Virgin America already operating the two smaller variants of Airbus narrowbodies – it has 10 A319s and 45 A320s in its fleet,

with eight more A320s and 30 A320neos on order – Cush says the carrier is also keen on acquiring the larger A321.

"We love the A321s, we are tremendously interested in that airplane," he says, adding that the airline expects to have the model in its fleet "soon", and describing the A321neo as a "game changer".

California-based Virgin America is among the few US low-cost Airbus operators which does not use the largest variant of the manufacturer's single-aisle family.

JetBlue Airways and Spirit Airlines operate the A321, and Frontier Airlines should take delivery of its first example later this year. ■

SAFETY DAVID KAMINSKI-MORROW LONDON

Pilot procedural lapses led to under-powered Porto take-off

Belair captain failed to input revised engine thrust data after distraction, says safety agency

Swiss investigators have found that a distracted Airbus A320 captain failed to reprogram the flight-management system for a short-runway departure from Porto, leaving the aircraft under-powered during its take-off roll.

The Belair aircraft conducted the take-off from intersection F on runway 17. Although the runway is 3,480m (11,400ft) in length, the intersection departure reduced this to 1,900m.

Despite both pilots observing, during the take-off run, that the remaining runway appeared unusually short, there was no attempt to increase the engine thrust.

The A320 reached its decision speed of 140kt (259km/h) just 700m from the end of the runway and lifted off with 350m left, says Swiss investigation authority SUST, which ran the inquiry.

SUST has determined that the captain initially opted for a full-length runway departure, rather than an intersection take-off, which would have required maximum power.

But having programmed the flight-management system accordingly, and briefing for a full-length take-off, the captain reconsidered the plan after realising that the aircraft's weight of 62.8t was lower than he had estimated.

He recalculated the engine power required for an intersection departure and recorded it on paper.

SUST believes that the first officer's biased assumption and time pressures led to the oversight

But the captain subsequently became distracted by a missing passenger and left the cockpit without reprogramming the flight management system.

SUST says the captain "broke his habit" of programming the conservative intersection data and recording full-length data on paper.

"This made it possible after the

distraction for the commander to regard the piece of paper as confirmation that the take-off data for an intersection take-off had been programmed in accordance with his usual habit," it adds.

The first officer incorrectly assumed that the correct data had been put into the flight-management system.

Although the 'before start' checklist requires both pilots to cross-check the take-off data, the crew failed to notice that the programmed data did not correspond to the calculation on the captain's electronic flightbag.

SUST believes the first officer's "biased" assumption that the captain had programmed the system with the correct data, time pressures from a 21min pushback delay, and a "one-off careless execution of a check" contributed to the oversight.

No-one was injured and the aircraft (HB-IOR) was undamaged. The A320 had been bound for Palma de Mallorca, as an Air Berlin service, on 1 October 2013. ■

CABIN DAVID KAMINSKI-MORROW LONDON

BA plans wider appeal for 787 economy seats

British Airways is to widen the economy-class seats in its Boeing 787s in response to customer feedback on the twinjet type.

The airline is taking the seat width to 17.3in on its 787-9s, the first of which will be introduced on the Delhi route in October.

It will have nine-abreast seating in the 787-9 economy cabin, which will have 127 seats, versus 154 on the shorter 787-8.

Both types will eventually feature wider seats, says BA, although it has not given a date for retrofitting the 787-8 fleet. Nor has it indicated whether the seats will be sourced from its current supplier.

BA has not detailed reasons for the decision, only stating: "We've listened to our customers and are reacting to their feedback." ■



Customers want more space



Jet2 budgets
for more 737s
AIR TRANSPORT P17

PROGRAMME TOM ZAITSEV MOSCOW

Iranian trio study Sukhoi Superjet

High-level talks with Russia to continue later this year as “pent-up demand” emerges as nuclear sanctions lifted

Caspian Airlines, Kish Air and Zagros Airlines have been identified as Iranian operators exploring the viability of acquiring Sukhoi Superjets.

Speaking at the recent MAKS air show in Moscow, Iranian vice-president Sourena Sattari named the trio as carriers studying the regional airliner, noting: “In particular, they wanted to know how the Superjet would perform, given our specific climate and elevated terrain conditions.”

He adds: “Their first impression is only positive. I think many operators would take these

aircraft, provided a sound financial proposition [is presented].”

At the show, Sattari headed a large Iranian government delegation looking into ways of broadening co-operation with Russia’s aerospace industry.

His Russian counterpart, deputy premier Dmitry Rogozin, says serial production and availability of new commercial aircraft such as the Superjet featured prominently during talks. “We’ve agreed to continue consultations in that respect and hope they will bring results,” he adds.

Sukhoi Civil Aircraft’s presi-

dent Ilya Tarasenko is confident the manufacturer will be able to supply the required number of Superjets to Iran following the end of international economic sanctions against the country.

“There is demand for up to 100 regional aircraft,” he says. “We’re looking at routes on which they could be efficiently deployed by Iranian carriers. We also consider setting up a technical support station and outsourcing production of some components for Superjets to local firms.”

Russia’s industry and trade minister Denis Manturov is ex-

pected to continue high-level talks on the matter during a visit to Tehran in December.

Last month, Russia’s Sberbank Leasing indicated it was interested in arranging deals with Iranian operators for the SSJ100, citing “considerable pent-up demand” given the nation’s aircraft modernisation needs.

“As soon as that market opens up, we’ll have a window of opportunity during a very short period. We’ll be certainly interested in using it jointly with Sukhoi,” says board chairman and acting general director Kirill Tsarev. ■



Kish currently operates elderly Boeing MD-80s

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Ken Gile

Chief Operating Officer (COO)
flydubai



Victor Brandao

General Manager
Alpha Aviation Academy

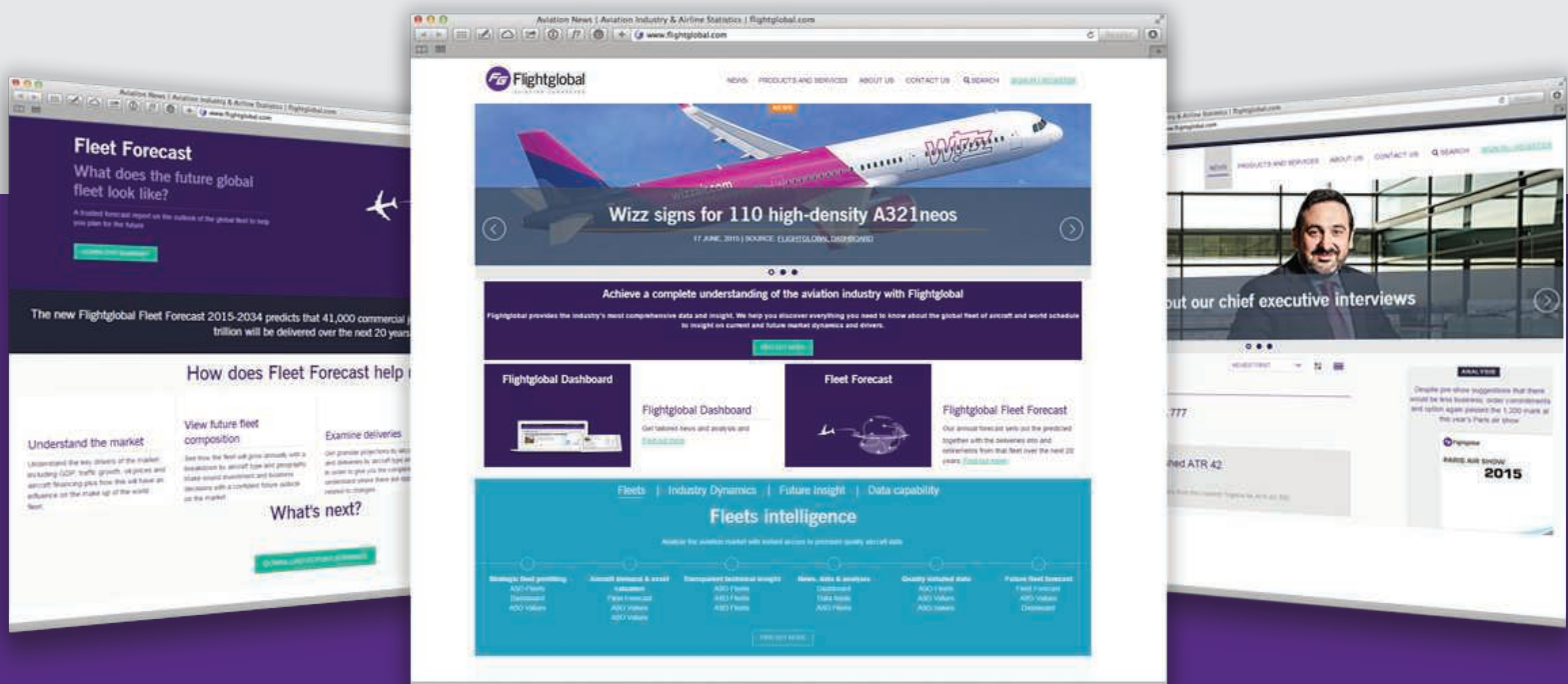


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USAF under fire for
programme errors
DEFENCE P18

AIR TRANSPORT

COMMITMENT GREG WALDRON SINGAPORE

Jet2 budgets for more 737s

Low-cost carrier signs for 27 Boeing narrowbodies with deliveries to commence in 2016

UK-based budget carrier Jet2 has signed an order with Boeing for 27 737-800 aircraft worth about \$2.6 billion at list prices, marking the airline's first direct deal with the US airframer.

"Today's order for 27 additional 737-800s will be delivered over the next two years and will provide Jet2.com with a cost-effective, reliable and comfortable environment to allow us to build on our highly successful family-friendly business," says Jet2 executive chairman Philip Meeson.

"We are extremely pleased to have finalised this order for more of what has already proven to be a popular aircraft within our fleet."

Jet2 says that the new 737s will be used to address anticipated



The airline already operates 46 examples of the twinjet

growth of its leisure travel business and for fleet replacement, allowing increased capacity across all its bases.

Deliveries of the 27 aircraft will take place between September 2016 and April 2018, with the acquisition funded through "a combination of internal re-

sources and debt", the carrier says. It adds that it has "negotiated significant discounts from the list price".

Flightglobal's Fleets Analyzer database records Jet2 as operating 59 aircraft, comprising 46 737s, 12 757-200s and a single Airbus A320. ■

FLEET
ELLIS TAYLOR SINGAPORE

Scoot retires its final 777-200ER

Scoot has retired its last Boeing 777-200ER from scheduled operations, completing its switch to an all-787 fleet.

The aircraft (9V-OTC) operated its final revenue flights with the carrier on 2 September, after completing a Tokyo Narita-Taipei Taoyuan-Singapore service.

"Since deploying our first Dreamliner in February of this year, Scoot has transitioned to an all-787 fleet in record time – just seven months," says chief executive Campbell Wilson.

Flightglobal's Fleets Analyzer database shows the airline now operates five 787-9s and two -8s, from an order for 10 of each.

The retired 777 was built in 1997 for Scoot's parent, Singapore Airlines. ■



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DEVELOPMENTS JAMES DREW WASHINGTON DC

USAF under fire for programme errors

Senators lambast misreporting of 26% increase in LRS-B cost estimates and poor handling of KC-46A tanker production

US Senate Armed Services Committee leaders John McCain and Jack Reed have fired warning shots at the Pentagon over its handling of the US Air Force's Long-Range Strike Bomber (LRS-B) and Boeing KC-46A tanker programmes, after it unwittingly reported false long-term cost projections for the former and has experienced development delays and cost overruns on the latter.

In a 26 August letter to US defense secretary Ashton Carter, the senators demand an explanation for the misreporting of 10-year LRS-B cost estimates, which appeared to have jumped from a projected \$33.1 billion last year for the period 2015-2024 to \$58.4 billion this year until 2025: a 76% increase. The USAF recently corrected its calculations, saying the true number is \$41.7 billion, or a 26% rise over the 2014 calculation.

Air force secretary Deborah Lee James describes the accounting error as a "regrettable mistake", and notes that the programme's costing factors have not changed



Concurrent testing and production of 767 derivative is a concern

over the last two years. The service wants to buy between 80 and 100 next-generation bombers for about \$550 million per copy, and will soon select either Northrop Grumman or a Boeing-Lockheed Martin team for a multi-billion-dollar development contract.

McCain and Reed have requested a detailed breakdown of the revised \$41.7 billion figure, and an explanation for the increase.

"Such dramatic discrepancies in the long-term cost estimation for the LRS-B programme are dif-

ficult to understand, and unfortunately do not inspire confidence about the department's management of this important acquisition programme," they write. "To commit administrative errors amounting to tens of billions of dollars is simply unacceptable."

In a separate letter, McCain also raises concern about the KC-46A programme, saying Boeing's decision to press forward with early production activities "at its own initiative and cost" comes with inherent risks.

"A concurrent test and production strategy increases the risk of redesign and retrofit to address potential issues found in testing, and has potential implications for schedule and cost," he says. "Should such issues arise, the government and taxpayer would not be responsible for these additional costs and would seek appropriate consideration."

Boeing received a development contract in 2011 for the first four aircraft, and a total of 18 operational tankers are required by August 2018 for initial operational capability. The manufacturer remains steadfast in its pursuit of that goal, despite twice reporting massive cost overruns due to improper wiring and problems with the integrated fuel system.

These issues, and a recent mix-up where the wrong substance was passed through the fuel system, have delayed flight testing of the first functional KC-46A, and are likely to delay a "Milestone C" production decision beyond a threshold date of August 2016. ■

INTEREST GREG WALDRON SINGAPORE

Jakarta advances on Chinook deal

Indonesia is in discussions with Boeing about offsets related to a planned acquisition of four CH-47F Chinook transport helicopters.

Boeing technicians have visited Indonesian Aerospace (also known as Dirgantara Indonesia) in

Bandung to discuss potential workshare in the programme, and the company has held talks with defence minister Ryamizard Ryacudu about the proposed deal, says the nation's defence ministry.

"The Ministry of Defence

plans to buy four Chinook helicopters to strengthen the air force's capabilities. This purchase can be tailored to the real threats facing Indonesia, especially the problem of natural disasters," it notes.

A statement issued in February had revealed that talks were under way linked to the potential acquisition.

Jakarta in 2005 first expressed interest in possibly obtaining four Chinooks, to bolster its disaster relief capabilities. Several CH-47SDs operated by the Republic of Singapore Air Force were active in disaster relief operations following the 26 December 2004 tsunami, which devastated coastal regions of Indonesia's Aceh province. ■



Indonesia was impressed by CH-47SD's role after 2004 tsunami

ACQUISITION

First Australian P-8As on order

Boeing has been awarded its latest production contract for the P-8A maritime patrol aircraft, with the \$1.49 billion deal covering nine more examples for the US Navy and the first four for the Royal Australian Air Force.

"By working together since the early stages of P-8A development, the US and Australia have created one airplane configuration that serves the needs of both countries," says USN P-8 programme manager Capt Scott Dillon.

Canberra approved an A\$4 billion (\$2.8 billion) allocation in early 2014 to purchase eight 737-derived P-8s, with options for four more. The aircraft will replace its Lockheed Martin AP-3C Orions. ■



Belarus signs up for next batch of Yak-130 trainers
DEFENCE P21



Previous orders for the medium-lift transport total 151 aircraft

PURCHASE ATUL CHANDRA BENGALURU

New Delhi approves order for additional 48 Mi-17 V5s

Indian air force to increase its fleet of Russian-built rotorcraft with deal worth \$1.1 billion

India's defence ministry has cleared the purchase of an additional 48 Mil Mi-17 V5 medium-lift rotorcraft from Russian Helicopters, for use by the nation's air force.

Worth an estimated \$1.1 billion, the procurement decision was taken during a Defence Acquisition Council (DAC) meeting that also deferred an an-

nouncement about an Indian navy requirement for more than 100 naval utility helicopters. An approval was given, however, for the purchase of eight Hindustan Aeronautics (HAL)-built Chetak utility helicopters.

The DAC approval will lead to the case for the Mi-17 procurement proceeding to the Cabinet Committee on Security, before a

formal contract can be signed. New Delhi has previously placed orders for a combined 151 Mi-17 V5s, through contracts signed in 2008 and 2012 for 80 and 71 examples, respectively.

All rotorcraft from the first order were delivered by May 2013, and the final three from the latter will arrive in India before the end of this year.

Russian Helicopters has already offered an upgrade package for the Indian air force's older Mi-17s, which would bring them closer to the V5 standard.

The aircraft would be equipped with new engines and auxiliary power units, and receive upgraded gearboxes and new navigation, communication and avionics systems. An improved self-protection capability is also proposed.

The latest order for the Chetak – an evolution of the European Alouette III design – will take total orders for the HAL-assembled type to approximately 360 units since licensed production began in Bengaluru in 1970.

The DAC's decision to place new orders is a surprise move, given the availability of the company's Dhruv advanced light helicopter. ■

ENHANCEMENT DOMINIC PERRY LONDON

Cold comfort for the Russian military

Russian Helicopters has begun flight-testing a new variant of its Mil Mi-8 transport designed specifically to be operated in the Arctic.

Development of the initially self-funded prototype – designated the Mi-8MTSh-VA – began in mid-2014, and production commenced last December.

The manufacturer says Russia's defence ministry will use the 13t type for troop transport, surveillance, and search and rescue missions, and that it ordered an undisclosed number of the variant in February. First deliveries are earmarked for late this year.

Adapting the helicopter to the Arctic environment has required Russian Helicopters to take into

account freezing temperatures, low visibility – including the polar night – and the potential loss of satellite signals for navigation equipment.

As a result, the -VA model has been equipped with uprated Klimov VK-2500-03 engines, a more capable Aerosila TA-14 auxiliary power unit and an enhanced transmission. It also gains an additional inertial navigation system, automatic dependent surveillance-broadcast receiver, night-vision goggle compatibility and extra fuel tanks to boost range.

Special covers will protect against the harsh conditions and make starting easier, while the cargo compartment also features extra thermal insulation. A civilian variant will eventually follow. ■

UNMANNED SYSTEMS
BARTOSZ GLOWACKI KIELCE

VTOL capability for Polish Manta

Poland's WB Group has unveiled a new version of its Manta tactical unmanned air vehicle. The aircraft is capable of vertical take-off and landing (VTOL), which the company says would enable it to operate from areas with limited space, such as an urban environment, the deck of a ship or a building's roof.

Displayed at the MSPO exhibition in Kielce, the VTOL Manta is powered by lift fans installed in its fuselage. The covers for these are opened during take-off and landing, enabling airflow to be directed according to operator needs. Its hybrid power system uses four electric engines and an onboard generator powered by a combustion engine.

The operational radius for the VTOL Manta is cited as 81nm (150km), with a 6h endurance and a service ceiling of 16,400ft. With an empty weight of 70kg (154lb) and a maximum take-off weight of 140kg, it has a 6.6m (21.6ft) wingspan and a fuselage length of 3.3m.

A Polish-designed autopilot will enable operators to perform flights using a pre-programmed route, with mission updates and real-time changes performed from a ground control station using a touch-screen display.

While the UAV is intended primarily to carry reconnaissance sensors, the version unveiled at the show was armed with a Sting gliding bomb. WB Group officials say the Manta could carry up to eight of the weapons, and that engineers are currently developing a Sting 2 version with more destructive force. ■



Lift fans in the fuselage allow the operator to direct airflow

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Making sense of
accident statistics
NEWS FOCUS P22



The proposal would
modify AH1s to Boeing's
AH-64E configuration

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ROTORCRAFT BETH STEVENSON LONDON

UK targeting \$3bn upgrade to keep Apache fleet flying

Washington backs rebuild of 50 British Army aircraft, but AH-64E buy also remains an option

The UK Ministry of Defence could spend around \$3 billion on a programme to remanufacture the bulk of its current fleet of AgustaWestland/Boeing Apache AH1 attack helicopters to the latter's AH-64E standard.

Following a request by the UK, the US State Department has given approval for the potential upgrade of 50 aircraft, the US Defense Security Cooperation Agency (DSCA) announced on 27 August.

"The upgrade and refurbishment of these helicopters will allow the United Kingdom greater interoperability with US forces," the DSCA says.

According to its programme outline, a Foreign Military Sales deal would be led by Boeing. An order would include 110 General Electric T700-701D engines, which

would replace the Turbomeca RTM322s which power the British Army's Apaches, plus refurbished Lockheed Martin target acquisition and designation sights and AAR-11 modernised pilot night vision sensors.

The rotorcraft's Longbow fire control radar would also be updated, while the deal would include 60 common missile warning systems, new navigation equipment, identification friend or foe systems, infrared countermeasures and Link 16 data link terminals. Technologies to support teaming between Apache crews and unmanned air systems would also be supplied.

Authorisation of a possible deal paves the way for a decision by the UK government on whether to proceed with the upgrade.

Further clarity is expected to emerge with the release of its new Strategic Defence and Security Review in October, with other options including a possible acquisition of new-build AH-64Es.

The British Army's AH-64D-based Apache AH1 fleet will increasingly face obsolescence issues, as the US Army moves towards ending its support for the Longbow model that it is progressively phasing out.

Flightglobal's Fleets Analyzer database shows the Army Air Corps as currently having 49 Apaches in service, with 16 more in maintenance or storage. The UK acquired an original 67 of the rotorcraft, with the type having seen extensive combat use in Afghanistan. ■

See Feature P26

ORDER JAMES DREW MOSCOW

Belarus signs up for next batch of Yak-130 trainers

Irkut has received a contract to supply Belarus with a second batch of four Yakovlev Yak-130 advanced jet trainers, with the commitment to increase the nation's inventory of the type to eight. The follow-on order, which covers deliveries during 2016, was signed during the MAKS air show in Moscow on 26 August.

Belarus placed its first Yak-130 order in 2013, with the four aircraft delivered in April 2015.

In Belarus air force service, the Yak-130 can prepare pilots to operate its RAC MiG-29 fighters and Sukhoi Su-25 ground-attack aircraft. Flightglobal's Fleets Analyzer database records these as totalling 37 and 68 aircraft, respectively.

"Mastering of [the] Yak-130 by personnel at Lida air base is scheduled by the end of this year," notes the service's chief, Maj Gen Oleg Dvigalev.

Other current operators of the Yak-130 are Algeria and Russia, with the type also on order for Bangladesh and Syria.

The twin-engined type can also be employed as a light combat aircraft, with a useful payload of 3,000kg (6,600lb). At the show, Irkut for the first time exhibited the type with a laser rangefinder installed, to support the use of air-to-surface weapons. ■



AirTeamImages

Minsk will get aircraft in 2016

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SAFETY PAUL HAYES & DAVID KAMINSKI-MORROW LONDON

Making sense of accident statistics

Although fatal aviation incidents can cluster together, judging safety standards based on this phenomenon is a mistake

Statistics don't lie. But their misinterpretation, deliberate or otherwise, can easily create a false impression. Air transport has frequently seen well-meaning but badly-executed statistical analyses intended, for example, to identify the 'safest' airline or aircraft type.

The perception of the overall safety of air travel also tends to suffer when high-profile incidents and accidents appear to occur in quick succession.

Clustering is a characteristic of randomness. If people in a large group are asked to stand in a random place in an empty hall they will probably spread out and put distance between themselves and others. The resulting distribution, perceived as random, would actually be considerably structured.

Search far enough along the random digits of pi and seemingly-meaningful patterns of numbers eventually turn up, such as a sequence of nine 7s in a row.

Independent air accidents are distributed randomly in time. But while there may be long periods when there are none – which understandably attracts little attention – there are also occasions in which multiple events happen over a few days or weeks.

Such clusters tend to create a media frenzy. Air accidents are rare and, as a result, can dominate headlines and lead to considerable questioning of the industry's safety record.

The apparent significance is interpreted by media outlets and,



There has been no fatal airliner accident involving a Western jet since Indonesia AirAsia A320 loss

in turn, the wider public: 'Several accidents in the last few weeks must surely mean that air travel has become unsafe?'

SAFETY RECORD

Excluding the Germanwings Airbus A320 crash in March, apparently the result of deliberate pilot action, no accidents had occurred in the first two-thirds of this year involving revenue passenger fatalities on Western-built jets.

As of 31 August, the interval since the last such accident had reached 246 days. This span from the Indonesia AirAsia A320 crash in the Java Sea on 28 December 2014 is not a record but, in the last 45 years, there have only been three occasions when the time between two accidents has exceeded this figure.

The longest interval so far is 323 days – between 3 January 2004, when a Flash Airlines Boeing 737 crashed into the sea shortly after take-off from Sharm-el-Sheikh, Egypt, and 21 November 2004, when a China Yunnan Airlines Bombardier CRJ crashed on take-off from Baotou.

The annual number of fatal accidents has been slowly decreasing over the years. During the 1970s there were 78 fatal accidents, equivalent to one every 47 days. So far this decade there have only been 13 such accidents, equivalent to one every 130 days.

But accidents do not occur at regular intervals and there are times when they bunch together.

Finding significance in particular clusters, to the exclusion of other points of data, gives rise to misinterpretations – the "sniper fallacy", for instance, in which a target is drawn around the tightest group of shots previously fired at a wall to claim evidence of accurate marksmanship.

Placing an artificial time boundary around a localised bunching of accidents is similarly misleading and can have a detrimental effect on the public's perception of airline safety.

Since 1970 there have been three occasions when two acci-

dents have happened on the same day, and 40 occasions when more than one accident has occurred in a seven-day span.

Never have three or more Western-built jet airliners suffered fatal accidents on the same day, although on one occasion three accidents happened in two days.

TYPICAL EFFECTS

There have been 53 occasions where three or more accidents happened within a 30-day period, and 10 instances of four or more. Five have been recorded on two occasions, and between 28 November and 29 December 1972 six accidents occurred in the space of 31 days. These figures illustrate that clustering is not only possible, but typical.

There is a known tendency for people to underestimate the likelihood of such bunching, and read significance into statistical clustering where none exists.

Spates of accidents over a relatively short period of time say nothing in themselves about the state of airline safety and – contrary to scaremongering headlines – do not mean that airlines have suddenly become less safe. ■

Paul Hayes is safety and insurance director for Flightglobal's Ascend Consultancy in London



Germanwings crash is thought to have been deliberate action



Experts see
warning signs
at Allegiant
NEWS FOCUS P25

PRODUCTION KATE SARSFIELD LONDON GREG WALDRON SINGAPORE

US validation of Legacy 450 heralds Embraer sales push

Launch customer set to receive first twinjet as airframer looks towards European market

Embraer is gearing up to deliver its first Legacy 450 business jet, with the superlight aircraft to be handed over to its US launch customer in the coming weeks.

US Federal Aviation Administration validation for the seven-seat twin was secured on 31 August, three weeks after Brazilian type certification was awarded.

The airframer is now working towards European approval for the Legacy 450 – the fourth clean-sheet aircraft in Embraer Executive Jets' 10-year history – which it hopes to receive by the year end.

In preparation for this validation, Embraer is stepping up its sales and marketing effort across the region. Business aviation services provider Atlas Air Service has been appointed as authorised sales representative for the company's entire business jet family, which runs from the entry-level Phenom 100 to the Lineage 1000E VIP airliner. It also will help promote the line-up in three of Europe's biggest markets: Germany, Austria and Switzerland.

"Europe is home to 17% of our 900-strong global fleet and our third-largest market, just behind North America and Latin America," says Embraer. "Europe is the most important market for the



Superlight aircraft secured FAA certification on 31 August

Legacy 600/650, being home to more than a third of the worldwide inventory."

Separately, Embraer says it is seeing softer private jet demand in the southeast Asia region, on the back of the slump in commodity prices.

"Resources aren't booming anymore, anywhere," Embraer Executive Jets sales director Manfred Baudzus told *Flight International* during an August marketing tour to promote the Legacy 500 in Asia. So far, just one example of the midsize business jet – a larger and longer-range version of the Legacy 450 – has been delivered in the

Asia Pacific region, to a customer in Australia.

"Generally, around Asia private jet demand has plateaued for the moment," Baudzus says. "It's certainly harder to find the clients in Asia than it was some years ago, and you've got to work a lot harder today."

The one bright spot that Baudzus sees is the Philippines, where the number of high-net-worth individuals has been growing. Still, he notes that opportunities in the nation are mainly confined to the smaller aircraft in Embraer's range, particularly the Phenom 100 and 300. ■

DELIVERY TOM ZAITSEV MOSCOW

Comlux receives its first Sukhoi Business Jet

Swiss business aviation services provider Comlux has ferried the first Sukhoi Business Jet from SuperJet International's headquarters in Venice, Italy, to its US facility in Indianapolis.

The aircraft, MSN 95060, is one of six long-range Superjet 100s initially earmarked for Russia's UTAir before the carrier cancelled the order, according to Flightglobal's Fleets Analyzer database.

Comlux says the central Asian branch of its VIP airline division, Comlux KZ – based in Almaty, Kazakhstan – will use the VIP airliner for charter services following a retrofit.

A \$200 million agreement signed by Comlux and Superjet in 2011 covers an order for two long-range variants, plus an option for a further two.

Customisation of the first aircraft is expected to take between seven and eight months to complete, says Comlux Group president Richard Gaona. ■

MODIFICATION
MURDO MORRISON LONDON

Greenpoint set to begin 777 VIP conversion

Boeing Business Jet specialist Greenpoint Technologies is to complete its first 777. The aircraft, a 777-200LR, will arrive at Greenpoint's widebody hangar in Moses Lake, Washington early next year, although the Zodiac Aerospace subsidiary says interior design work is already underway.

Greenpoint will not confirm the client or whether the aircraft is green or secondhand, but says the 777 is the latest "in a long list of Boeing models modified and completed, such as multiple 747s, 787s, 757s and over 20 737 BBJs".

Boeing figures to mid-August show there have been seven 777s delivered into VIP service, with five currently in use, and two outstanding orders. ■

PROGRAMME KATE SARSFIELD LONDON

Cessna begins delivering the Latitude

Cessna has handed over the first Citation Latitudes, less than three months after the midsize jet received US certification.

Pittsburgh, Pennsylvania-based charter company Aircraft Management Group was among the first operators to take delivery of the eight-seat twin.

The type has now begun a 28-day, 39-airport demonstration tour of the USA, with additional tours planned later this year for

Europe, the Middle East and Asia, Cessna says.

The Latitude was introduced by the Textron Aviation subsidiary in 2011 as a competitor to the Embraer Legacy 500, which entered service late last year.

The Pratt & Whitney Canada PW306D1-powered Latitude is positioned in Cessna's nine-strong Citation product line between the superlight XLS+ and the midsize Sovereign+. ■



The type is now on a 39-airport demonstration tour of the USA

France will take the spotlight as “feature country” at Singapore

Singapore Airshow 2016 will welcome France as the Feature Country in the fifth edition of the show, scheduled to take place from 16 to 21 February 2016, at the Changi Exhibition Centre.

The Feature Country series, which made its debut at the 2014 Airshow, was developed as a permanent feature to enable the companies exhibiting within the pavilion to leverage on the Singapore Airshow as a strategic platform; lending support to businesses of the Feature Country and enabling them to tap the opportunities in the Asia Pacific region and beyond.

The French Pavilion will be located at a prominent spot within the exhibition hall. Participating exhibitors will have access to a dedicated “Deminar” area – a demonstration and seminar area for research institutes and universities to showcase their latest technologies and innovations. In addition, business meetings between the French Pavilion exhibitors and VIP delegations will also be specially facilitated.

“Being a Feature Country at the Singapore Airshow 2016 gives us the unique platform to bring together our latest and best aviation technologies to meet the growing appetite for innovation in the Asia Pacific aviation sector, translating into real business deals for our French companies,” said Emeric D’Arcimoles, the Paris Air Show Chairman and Chairman of the



International Committee of Groupement des industries françaises aéronautiques et spatiales.

The French aerospace, defence and security industry is worth 47.9 billion Euros, and specifically, out of which 30.4 billion Euros is contributed by exports. This shows that France is well-placed to leverage its Feature Country platform to bring its latest innovations to the region's top decision-makers converging at Singapore Airshow 2016.

This comes at an opportune time in the Asia Pacific aviation industry, where the com-



an **experia** event

mercial aerospace sector is expected to set new records for aircraft production in 2015, off the back of the accelerated replacement cycle of obsolete aircraft and growing passenger travel demand in the Asia Pacific region. Countries in the region are also increasing defence spending to equip their militaries with modern defence platforms and technologies.

Reflecting this growth is the continued expansion of reach and impact of each new edition of Singapore Airshow. The 2016 show is already 80 per cent committed, with specialised spaces like the Aerospace Emerging Technologies Zone, the Training and Simulation Zone and the introduction of the Business Aviation Zone, to further spawn business development opportunities.

For more information about the Feature Country programme, please contact Ms Chong Kam Lin at kamlinchong@experiaevents.com or +65 6595 6124.

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Tough decisions
COVER STORY P26



The Teamsters union released a report citing 60 maintenance-related incidents in the seven months to March 2015

SAFETY JON HEMMERDINGER WASHINGTON DC

Experts see warning signs at Allegiant

Series of maintenance-related incidents over last 18 months prompts call for greater FAA scrutiny on Las Vegas carrier

A string of maintenance issues over the past 18 months has prompted a number of safety experts to call on the US Federal Aviation Administration to heighten oversight of Las Vegas-based Allegiant Air.

The latest incident, on 17 August, saw a missing nut on the elevator of a Boeing MD-83 cause the control surface to jam during take-off from Las Vegas International airport, leading to a premature rotation of the aircraft and consequent aborted departure.

"During the take-off roll, the pilots recognised a malfunction in the flight control system and aborted the take-off," says Allegiant in a statement. "Upon inspection, it was discovered that the left elevator boost actuator had become disconnected."

The FAA says a missing nut caused the malfunction. "A preliminary investigation found that a nut on a component that moves the left elevator had fallen off, causing the control surface to become jammed in the up position," it says.

Allegiant declines to make an executive available to discuss the incident, but says it reported the event to the FAA and National Transportation Safety Board and inspected its entire MD-80 fleet.

"The continued safety of our passengers and crew is always our

top priority," says Allegiant. "The investigation is ongoing, and we are cooperating with the FAA."

Although the aircraft returned safely to the gate, experts say the incident is a concern. "Any time you have a flight control issue with any aircraft, especially a commercial airliner, it is a big concern," says Gregory Feith, former senior air safety investigator at the NTSB. "What is going on? This is not the first problem Allegiant has had in the last 18 months," he says.

OVERSIGHT

"This is one of those items that you don't mess around with," says John Goglia, a former NTSB member. "I hope that the FAA ups the ante – that they bring in some good people and provide some oversight, so we don't see a repeat of ValuJet."

That now-defunct carrier – co-founded by Allegiant chief executive Maurice Gallagher – was plagued by maintenance problems: between 1 January and 10 May 1996, more than 50 ValuJet flights returned due to maintenance issues, Goglia says.

A lack of oversight by the carrier and a maintenance subcontractor was also blamed for the crash on 11 May 1996 of ValuJet flight 592, which caused the deaths of 110 people.

ValuJet executives later acknowledged that problems stemmed from its rapid expansion, growing to a fleet of 53 aircraft in just two-and-a-half years.

Prior to the crash, FAA officials had called for the carrier to be grounded, but the request was lost in its systems.

"Any time you have a flight control issue with any aircraft, it is a big concern"

GREGORY FEITH
Former air safety investigator, NTSB

Allegiant's 17 August incident follows other maintenance-related events experienced by the carrier. This summer, Allegiant aircraft made at least three emergency landings at Florida's St Pete-Clearwater International airport, one in Orlando, two in Las Vegas, and one in Greensboro, North Carolina.

In April, the International Brotherhood of Teamsters, which represents Allegiant pilots and is seeking a new contract, released a report citing about 60 maintenance-related instances in which Allegiant aircraft returned to the gate or diverted over a seven month period between September 2014 and March 2015.

The report, compiled by the Teamsters' mechanics' division, noted problems with engines and hydraulic systems, and a stabiliser trim failure. Also, "several" Allegiant mechanics reported the company had not adequately lubricated stabiliser trims.

Feith calls the number of events "inordinate".

WARNING FLAGS

"Those are the warning flags that the FAA is supposed to be paying attention to," says Goglia.

Allegiant declines to comment on the emergency landings or Goglia's ValuJet comparison.

The company says it has not been notified of additional oversight, but says the FAA increased its scrutiny earlier this summer in response to the Teamsters' report.

"The FAA did not find any safety concerns that merited slowing our growth," Allegiant, which was founded in 1997, adds, referring additional questions to the FAA. The agency says it is "looking into" all recent events but provides few details, saying it will "adjust" surveillance if Allegiant needs to take corrective action.

Allegiant's fleet currently stands at 76 aircraft, including 53 MD-80s, 17 Airbus A320-family aircraft and six Boeing 757s, according to Flightglobal's Fleets Analyzer database. ■



Boeing/AgustaWestland Apache AH1s must be upgraded or replaced, since the type will lose technical support from the US Army

TOUGH DECISIONS

With its Strategic Defence and Security Review due next month, the UK government is deciding which gaps are most pressing – particularly in the fight against extremism

BETH STEVENSON LONDON

As the UK nears the release of its next Strategic Defence and Security Review (SDSR) in October, the pressure on the government to answer a number of questions surrounding capability gaps and needed upgrades continues to mount.

A Conservative party win in May's general election led to chancellor of the exchequer George Osborne committing, during the budget in July, to the UK meeting the NATO-advised spending benchmark of 2% of GDP on defence. Osborne also promised real-term increases per year of 0.5% to some £38.9 billion (\$61 billion) by 2020/2021, and with this commitment maintained the UK's position as one of the top spenders within NATO.

How the UK will spend these funds is largely speculative, although certain capabili-

ty gaps will inevitably be addressed in the SDSR, as well as a few new areas that until recently were not considered priorities.

Ahead of a visit on 13 July to the Royal Air Force's Waddington base in Lincolnshire – the home of the service's surveillance aircraft fleet, including the General Atomics Aeronautical Systems MQ-9 Reaper unmanned air vehicle – Prime Minister David Cameron said that the pledged spending needs to be focussed on key areas, including UAVs, special forces and counter-terrorism assets.

AREAS OF NEED

"Now we know how much we will spend; what matters next is how we spend it," Cameron said. "I have tasked the defence and security chiefs to look specifically at how we [can] do more to counter the threat posed by ISIL [Islamic State] and Islamist extremism. This could in-

clude more spy planes, drones and special forces. In the past five years, I have seen just how vital these assets are in keeping us safe."

The government is further involving itself in the coalition air campaign against Islamic State insurgents in Iraq, which defence secretary Michael Fallon told the House of Commons on 3 July should be extended to neighbouring Syria.

"Air-to-air refuelling and other sophisticated airborne assets play a vital role in enabling other nations to conduct strikes that they would otherwise be unable to do on their own," the government says. "In order to ensure the UK remains at the forefront of the fight against extremism, it is important to continue investing in this area."

As a result of this commitment, the RAF's Panavia Tornado GR4-equipped 12 Sqn that is operating against IS has had its planned retirement delayed further until March 2017, Fallon

announced on 4 August.

Eight Tornados are flying in support of the mission, which has helped Iraqi forces push back IS from the Kurdish region and from cities such as Tikrit and Baiji, Fallon says.

EUROFIGHTER UPGRADES

The squadron was originally due to be disbanded in 2014, ahead of the completion of the UK's combat involvement in Afghanistan. This decision was reversed in January 2015, when the demand on the Tornados in Iraq became apparent, and the retirement date was first extended until March 2016.

The life of the aircraft past this date remains to be seen, but until the required upgrades are made to the Eurofighter Typhoon to enable it to carry out the same ground-attack role, the Tornado GR4 is the go-to RAF aircraft.

Upgrades to the RAF's Typhoons include new weapons integration and the development of the Captor-E active electronically scanned radar, although a contract for production of the latter has yet to be signed.

The E-Scan radar was installed on the UK's instrumented production aircraft IPA5 for flight testing and showcased during the Farnborough air show in July 2014. A German Tranche 3 aircraft has also been modified into IPA8 for the new radar system integration.

"Ground-based testing of the wider aircraft systems impacted by the implementation of the E-Scan radar system continues, and flight development testing using the two IPAs will commence after this is completed," Selex ES, which leads the radar development, says.

"The new radar will be available to satisfy the operational requirements and timings of all the air forces that are operating the Eurofighter Typhoon, as well as future export customers currently evaluating the aircraft," BAE tells *Flight International*.

Separately, the UK's fleet of Boeing/Agusta



A long-planned radar upgrade will boost the Tranche 3 Typhoon's capabilities

Westland Apache AH1s will need to be replaced or upgraded in the near future, as US support for its baseline design is discontinued as the type is phased out.

While an acquisition of a brand-new aircraft is expected by some – and could still be an option – the US State Department on 27 August authorised the possible remanufacture of 50 of

"Now we know how much we will spend; what matters next is how we spend it"

DAVID CAMERON
UK prime minister

the British Army's AH-64D-derived Apaches to the latest E-model standard, under a deal worth a potential \$3 billion.

Further clarity on the army's rotorcraft plans are expected to emerge in the SDSR.

If advanced, the modernisation activity would be led by Boeing and would include 110 replacement General Electric T700-701D engines, refurbished modernised target acquisition and designation sights and modernised pilot night vision sensors from

Lockheed Martin, and refurbishment of the type's Longbow fire control radar. It also would provide new common missile warning systems and updated navigation and crew equipment, the US Defense Security Cooperation Agency says.

Meanwhile, BAE is investing in the future through unmanned combat air vehicles.

The company leads the Ministry of Defence's Taranis UCAV development, which has so far undergone two test flight campaigns – one in 2013 and one in 2014.

"Taranis is designed to demonstrate our ability to create an unmanned system capable of undertaking sustained surveillance, marking targets, gathering intelligence, deterring adversaries and carrying out strikes in hostile territory," BAE says.

The company notes that the second series of tests saw the UCAV fly in full stealth mode for the first time.

"We are continuing to gather data and complete additional test points as per the requirements of the test programme," BAE says. "We are in discussion with the MoD over the next stage of testing for the aircraft, including any further flight trials."

FUTURE COMBAT

BAE also is involved in a two-year feasibility study for the Anglo-French Future Combat Air System (FCAS) programme.

The bilateral study builds on promises made by the two nations under the Lancaster House treaty signed in 2010, and a 2014 agreement has seen industry from France and the UK pair up to co-develop what could be the future of air power.

"Work continues on the two-year FCAS feasibility phase study, the contract for which was awarded in October 2014," BAE says. "We are currently less than a year into the study and are working to define and mature common collaborative concepts and core systems. It is too early to comment further at this point."

Elsewhere, aircraft manufacturers continue to hold out on the SDSR for more transparency on what capability will fill the UK's maritime patrol aircraft (MPA) gap, which



The need to strike Islamic State militants in Iraq has kept the RAF's 12 Sqn flying Tornado GR4s



Northrop Grumman

Northrop Grumman sees a need for Triton

» was left by the cancellation of BAE's Nimrod MRA4 in the 2010 review.

Tensions emanating from Russia have highlighted the need for an island nation like the UK to have such a capability, and pressure continues to be laid on the government to provide a Nimrod replacement.

An obvious – and likely – choice is the Boeing 737-based P-8 Poseidon that is operated by the US and Indian navies and is on order for the Royal Australian Air Force.

While arguably the most capable candidate available, it is costly. Yet it is believed to be high on the MoD's equipment wish list.

SEEDCORN

Although the P-8 appears to be in a preferred position, it faces competition, as other manufacturers are offering adapted airframes for the yet-to-be-formalised requirement. These include Lockheed Martin, with a modified C-130J tactical transport, Airbus Defence & Space with its C295, and a potentially surprise contender in the form of the Kawasaki P-1. The Japanese aircraft made its international debut in the UK in July, when a pair of the four-engined type were sent to the Royal International Air Tattoo to showcase its capabilities.

One indication of the wants of the MoD could be the continuation of its Seedcorn effort: a programme that sees UK personnel integrated with international units, including the US Navy, where they support operations with the P-8 and Northrop Grumman's in-development MQ-4C Triton unmanned air vehicle.

The Seedcorn initiative has been extended for a further three years, it was revealed in July, meaning that the UK will be able to maintain its MPA know-how, and gain direct experience on the P-8 ahead of any potential acquisition.

RAF personnel assigned to the P-8 have the largest footprint in Seedcorn, with 20 allocated to operating the type, the service says.

Meanwhile, Northrop remains hopeful that the UK's maritime patrol gap will lead to prospects for the company with its maritime high-altitude UAV. Northrop has not been shy in expressing its interest in the UK as a potential

UNMANNED SYSTEMS

NAVY LOOKS TO CATCH UP ON UAV CAPABILITY

WHILE THE UK Royal Air Force has an abundance of operational unmanned air vehicle experience, its naval sister service is a relative novice in UAV operations and is exploring ways to integrate such technology.

First Sea Lord Adm George Zambellas appears to be behind the change in approach, as his advocacy for UAV use in RN operations has led to many current efforts being introduced under his watch.

One is the Rotary Wing UAS programme that kicked off in August 2013, when a two-year capability concept demonstration contract was awarded to AgustaWestland with relation to its SW-4 Solo optionally-piloted helicopter.

The contract to develop a system that could be ship-launched around 2020 was highly sought after. AgustaWestland beat Northrop Grumman/QinetiQ and Lockheed Martin/Saab teams – companies with copious amounts of UAV development experience – to the award, despite having relatively limited knowledge in this area.

The team has now carried out the demonstration,

AgustaWestland says, and results are pending from the Ministry of Defence, which is expected to release details within the coming month.

Another ship-launched endeavour supported by the navy was the launch of a 3D-printed model UAV from its patrol vessel HMS Mersey in July.

A team launched the Southampton University Laser Sintered Aircraft (SULSA) UAV under its Project Triangle, demonstrating the potential of lightweight platforms that can be used for short-range surveillance.

BEYOND 2020

The 5min sortie covered a range of 500m, with the UAV carrying a small video payload to record the mission so that operators could monitor it during the flight. The project was supported by Zambellas, who offered HMS Mersey to aid the development of SULSA.

The navy's first unit dedicated to unmanned operations – 700X Naval Air Squadron, based at RNAS Culdrose in Cornwall – was established in December 2014 to support the Insitu ScanEagle UAV that is operated under a contractor-

owned, contractor-operated agreement. This has seen the ScanEagle deployed from Type 23 frigates HMS Kent, Northumberland and Somerset, plus the Royal Fleet Auxiliary ship Cardigan Bay.

"It's well known that our first squadron of remotely piloted aircraft have proven their worth in the Gulf, providing persistent airborne surveillance across huge areas of sea," Zambellas says. The SULSA trial will help the service to explore how "simple, automated systems have the potential to replace complex machines", he adds.

Insitu parent company Boeing confirmed during July that its contract with the UK for ScanEagle operations had been extended until 2017 from an original two-year, £30 million (\$47 million) deal signed in June 2013.

Longer term, the navy plans to introduce a new programme due to begin in 2022, although it has not yet revealed the requirements for any future unmanned system.

Boeing says there are no negotiations to extend ScanEagle operations, but it will "clearly offer it to fill the gap". ■



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customer for the Triton, and as the release of the review nears, the company tells *Flight International* that it is anticipating any indication of what the nation's future maritime patrol aircraft mix.

"We're watching that very closely. We're hoping that they'll get an MPA out of it," says

Drew Flood, the company's Triton programme executive for Europe.

Leveraging on the hope that the UK acquires the P-8, if it were to follow in the footsteps of the USN and Australia, a mixed Poseidon/Triton fleet could meet its maritime needs.

"We're sitting and waiting," Flood says. ■



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STRATEGIC THINKING



US Air Force

With three F-35Bs already being evaluated by the RAF, just how many examples the UK needs – and can afford – is a question that must be answered

In its pending defence and security review, the UK must fill in any gaps in its combat aircraft planning for operations beyond 2019

CRAIG HOYLE LONDON

One of the key areas of clarity anticipated with the publication next month of the UK government's second Strategic Defence and Security Review (SDSR) concerns the size and shape of its future combat aircraft fleet.

Today, the Royal Air Force operates two types in the defensive and offensive roles: the Eurofighter Typhoon and Panavia Tornado GR4. Its use of the latter is due to conclude later this decade, with its capabilities to be assumed by the Typhoon and Lockheed Martin F-35 Lightning II, which is being acquired in the short take-off and vertical landing (STOVL) B-model variant.

Released five years ago, the UK's previous SDSR contained several controversial decisions, including the early retirement of the RAF's and Royal Navy's joint fleet of BAE Systems Harrier GR9/9A ground-attack aircraft.

The rationale behind the 2010 decision was that only by entirely removing an aircraft type from use would the required level of financial savings be realised, in both the operating and

support areas. Despite a strong showing in Afghanistan and its embodiment of the RN's prized carrier strike capability, the iconic Harrier was sacrificed – in part due to the Tornado's ability to deploy the strategically-important MBDA Storm Shadow cruise missile.

The departure of the GR9/9A fleet in December 2010 stripped the UK of its last aircraft carrier-based strike aircraft, with the RN's own Sea Harrier FA2 fighters having been retired in 2006. Other models that have left UK use in the last decade include the RAF's Sepecat Jaguars – in 2007 – and the air defence-rolled Tornado F3, retired in 2011.

The disappearance of these types has seen the number of combat air squadrons trimmed significantly, and has had a major impact on the UK's military pilot training requirement.

Today, the RAF has five frontline Typhoon squadrons, located at two bases. Its main operating location for the type, at Coningsby in Lincolnshire, hosts its 3 and 11 squadrons, plus the 29 Sqn operational conversion unit (OCU) for the type. RAF Lossiemouth in Scotland is the home for its 1, 2 and 6 squadrons.

SQUADRON STRUCTURE

With two units having been disbanded in March 2014 as part of a planned gradual fleet run-down, there are now only three operational squadrons equipped with the Tornado GR4: 9, 12 and 31, all based at RAF Marham in Norfolk. Flight activities also continue on the type's 15 Sqn OCU at Lossiemouth.

The Tornado force is currently expected to remain in service until 2019, and its involve-

The Tornado force is currently expected to remain in service until 2019



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ment in the US-led operation against Islamic State militants in Iraq has twice seen the Ministry of Defence defer plans to further trim its squadron structure. Most recently, defence secretary Michael Fallon on 4 August announced that 12 Sqn will fly on until March 2017, and hailed the variable-geometry type's delivery of "precision firepower, intelligence and surveillance" from RAF Akrotiri in Cyprus.

The RAF has played a long game when it comes to "combat air" in advance of the new publication. Its future force mix will contain the Typhoon and F-35B, but many questions remain about timings and aircraft numbers.

INTERNATIONAL MISSION

Speaking during a BAE-organised media briefing at the Royal International Air Tattoo (RIAT) in the UK in July, several of the RAF's senior commanders shared their thoughts about the continuity of capability post-Tornado, and their reasoning behind type selections for current missions.

For Air Marshal Baz North, deputy commander capability, the message is clear: there will be "absolutely no gap in capability" when the last Tornado GR4s are retired.

To date, the Typhoon force's only offensive air-to-surface action was alongside the GR4 over Libya in 2011. Since then, the Eurofighter has been focused on providing quick reaction alert cover for the UK and the Falkland Islands. In late August, a four-month detachment of aircraft to Amari air base in Estonia concluded, with the aircraft providing part of NATO's Baltic Air Policing service – intercepting Russian air force types including the RAC MiG-31.

North defends the RAF's decision not to deploy Typhoons in the international mission against Islamic State so far – although several were temporarily sent to Akrotiri to ensure the safety of airspace in the region, before a UK parliamentary decision was made, preventing the UK from performing strikes inside Syria.

Noting that the service must deliver both air-to-air and air-to-surface capability, North says: "We are performing the jobs with the best aircraft for those jobs. We are applying the right platform at the right time."

While the Eurofighter programme's marketing push to secure fresh export orders and extend production beyond 2018 or 2019 could benefit from a ground-attack deployment, the RAF's timetable does not support this.

An ongoing effort now referred to as Project Centurion is to add key weapons to the Typhoon, including the Storm Shadow and the Brimstone 2 evolution of the MBDA air-to-surface missile now being used by Tornado crews in the Middle East. These enhancements will follow the addition of MBDA's Meteor beyond visual range air-to-air missile, and provide a swing-role capability to support a range of operational requirements.



Typhoons will gain new air-to-surface weapons through Project Centurion

The timing of Project Centurion leaves little room for error, with the standard due to achieve operational readiness in December 2018 – just months before the Tornado's expected retirement. This will also follow the introduction of the nation's first F-35Bs with the RAF's 617 Sqn, although the new type will need more time to gain full combat capability, placing even more emphasis on the Typhoon.

Preparations for swing-role operations have included exercises for several Typhoon squadrons over the past year, with aircraft sent to Malaysia, Oman, Turkey, the United Arab Emirates and the USA. Most recently, Typhoons exercised in the UK along with Sukhoi Su-30MKI fighters from the Indian air force.

Questions that need answering in the SDSR include the fate of the RAF's earliest, Tranche 1 Typhoons. While comparatively young in terms of airframe life, these cannot be upgraded to its planned advanced configuration, and an early retirement is expected. What the UK then opts to do with them remains to be seen.

"We have the best aircraft for the job. They are the right platforms at the right time"

AIR MARSHAL BAZ NORTH

Deputy commander capability, RAF

For now, the RAF is taking delivery of Tranche 3 production-standard Typhoons – in advance of expected future upgrades that will add new weapons and, potentially later this decade, an active electronically scanned array (AESA) radar – and is placing them into temporary storage, to spare them from fatigue.

RAF officials decline to detail the number of Tranche 3 aircraft which are in storage, but North notes: "This is a 6,000h platform – we are looking to get the most out of it."

In BAE's recent half-year financial results statement, the company revealed: "In the six months to 30 June, six Typhoon aircraft were delivered from the UK final assembly facility, of which four were delivered to Saudi Arabia."

By mid-year, the RAF had received 129 of an eventual 160 Typhoons. Flightglobal's Fleets Analyzer database indicates around 13 of its newest model have been completed so far.

EVALUATION ACTIVITIES

SDSR-watchers will be hoping for answers about the Tranche 1 Typhoon retirement plan and AESA modification, and also any change to the Tornado's expected departure date. Long-term indications are also anticipated in the unmanned arena, with the General Atomics Aeronautical Systems MQ-9 Reaper needing replacement and a potential Future Combat Air Systems risk-reduction activity being conducted in collaboration with France.

But one of the most eagerly-awaited elements of the document will concern the F-35B. Three of the type are already being used by the UK to support initial operational test and evaluation activities in the USA, with a fourth to be accepted during 2016. The MoD has already announced funding to acquire its first 14 operational examples, which should also be handed over from next year.

Initial operational capability with the RAF's 617 Sqn is planned for the following year at Marham, and the UK's second unit to be equipped with the STOVL type has been identified as the Fleet Air Arm's revived 809 NAS.

With the UK having previously committed to buying at least 48 F-35s but with the US programme of record still listing its interest at 138 of the type, this review could reveal how many of the fifth-generation type it needs – and more importantly, how many it can afford. Only then will the future strength of the UK's combat air capability begin to take shape. ■



Unmanned systems are a focus of the event, and the British Army's Watchkeeper will be on display

A SHOW OF STRENGTH

The UK's Defence and Security Equipment International exhibition is set to bring 1,500 companies to London, as industry responds to a tense atmosphere in Europe

CRAIG HOYLE LONDON

From 15-18 September, London's Docklands will again play host to the biennial Defence and Security Equipment International (DSEi) exhibition – the UK's largest tri-service industry gathering.

The show is set to attract around 1,500 exhibitors from more than 50 countries to the ExCel centre – including almost 450 who will be appearing for the first time. Around 32,000 visitors from 150 nations are expected: about the same as in 2013, the event's organiser says.

Clarion Defence and Security chairman Simon Williams says that this year's show will be staged against a backdrop of instability in Europe – a reference to the current tension between NATO nations and Russia. Noting that some countries, including Norway, Poland and the Baltic states, are moving to increase their defence spending in response, Williams says "there is a real change afoot".

"DSEi in 2015 is showing strong interest from around the globe," he said during a 7

July media briefing in London. Forty international pavilions will be located among its exhibits, and new participants are coming from nations including China, India, Israel, Pakistan and Taiwan.

The exhibition space will be divided into six dedicated zones: air, land, maritime, medical innovation, security and special forces, and unmanned systems.

While the only aircraft flying over the Docklands site will be those on approach to or de-



1,500 exhibitors will be at tri-service event

"The display of fixed- and rotary-wing military aircraft will surpass the 2013 edition"

CLARION EVENTS

parting from nearby London City airport, several military types will be on static display.

These will include a Royal Air Force Westland Sea King HAR3/3A search and rescue helicopter, which will be appearing at its last DSEi ahead of retirement, plus one of the Royal Navy's AgustaWestland AW101 Merlin HM2s. An AgustaWestland Wildcat, British Army Boeing/AgustaWestland Apache AH1 and an RAF Airbus Helicopters Puma HC2 will also be present, as will a full-scale replica of the Eurofighter Typhoon. "The display of fixed- and rotary-wing military aircraft will surpass the 2013 edition," Clarion says, adding that the air zone will be "notably larger" this time.

CLOSE SCRUTINY

The unmanned systems sector – one of the long-time focal points of DSEi – will again be a prominent area of attention, with two days of presentations to explore "the latest capabilities, technologies and innovations". These will include discussions about advances in air-space regulation, sense and avoid equipment, test and evaluation activities and manned-unmanned teaming concepts of operation.

Unmanned aircraft to be displayed will include the British Army's Watchkeeper and the Boeing Insitu ScanEagle. Both types have entered frontline use for the UK since the 2013 show, with the latter in operation with the RN under a contractor-owned, contractor-operated agreement with Boeing Defence UK.

Beyond the equipment on display within ExCel's north and south halls, the event will also feature multiple daily briefings in its seven seminar theatres, including keynote addresses from the UK's service chiefs and defence ministers. Their comments will be closely scrutinised, as the event falls around a month ahead of the publication of the nation's second Strategic Defence and Security Review in October. In total, more than 300 speakers will give presentations during the show.

A pre-event strategic conference at the same site on 14 September will look at the future of the military rotorcraft sector. Supported by the UK's Joint Helicopter Command, this will focus on long-term requirements, such as those being defined for the US Army's Future Vertical Lift programme.

Clarion event director Duncan Reid says the coming show will be "bigger and better" than in 2013, adding: "we should top that." ■



To access all our news coverage during the 15-18 September DSEi exhibition, visit flightglobal.com/defence

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Classic Air Force goes up for sale

We hear that Europe's largest collection of post-war classic aircraft is to be sold. The Coventry-based Classic Air Force, which operates more than 30 aircraft, including the world's oldest flyable jet, is open to approaches.

Bonhams will auction five machines at the Goodwood Revival on 12 September. The move follows founder Mike Collett's announcement that he intends to retire. While Collett is keen to keep the collection intact, he says he will consider any serious offer.

"The absolute essential is that they keep flying," he says. "These are living pieces of history, capable of teaching piloting and engineering skills that could otherwise be lost."

"Our commitment has always been to keep these aircraft alive and operational rather than leave them to become dead museum pieces."

He adds: "I'd prefer for them to remain a collection, of course, but if an offer came in for an individual airframe, and I was satisfied that the buyer could maintain it in airworthy condition, then of course I'd give it serious consideration, but I'm more interested in each aeroplane's future as living, flying history than I am in a tempting financial offer."

Out to launch

Graham Kinread submits this sneak shot taken at July's Yeovil Air Day. "A new launch pad for a secret replacement for the Harrier?" he wonders.



Jumping to conclusions



Spotted during a recent air fete in the UK, the wing furniture on this Junkers Ju-52 could have left the animal welfare folks crying fowl. "More poor bird than warbird," comments our roving snapper of the otherwise impeccable F-AZJU. The 1943-vintage transport, which sports Luftwaffe markings, is owned by France's Amicale Jean-Baptiste Salis.

A load of pallets

Fresh from the "only in Japan" files. Nine teams from five companies have taken part in Narita International airport's inaugural Forklift and Pallet Building Competition.

The airport says its objective in holding the event "was to expand the airport's volume of cargo handled through initiatives to improve quality of its cargo operation". It describes the contest, won by JAL Cargo Service, as "thrilling".

This from the country that invented some seriously strange game shows (Google it: we're not going to go into details).

Wright and Flight

During a visit to the Wright brothers memorial at Kill Devil Hills in North Carolina, our Thom Clayton took this snap of Orville Wright catching up on what's been going on in aviation



My copy's finally arrived

more than a century after that famous flight in 1903.

We can't be sure the brothers ever read *Flight*, which appeared six years after the Wright Flyer took to the air. However, given their extensive travels in Europe around that time, and Orville's longevity (he died aged 76 in 1948, 36 years after his brother, enjoying a distinguished latter career as an aviation ambassador), we'd like to think the fathers of aviation may have perused the odd issue.

A warm reception

A correspondent writing from Basra, Palestine, says the heat

100 YEARS AGO

is trying for men and machines, the engines requiring the greatest

attention. Pilots have had exciting times when forced to land, with so-called friendly Arabs coming to the landing ground armed to the teeth.

The broken circle

Canadian pilots in Hurricanes caught a formation of Jaguars

75 YEARS AGO

over Sussex. The squadron leader said ten of them were "in a

defensive circle" 3,000ft below. He led the dive attack and the Jaguars did not see the Hurricanes until too late. Their circle was broken up.

Heading for Venus

The two probes to Venus will provide authentic information

50 YEARS AGO

about the planet. The double flight will also help in developing

techniques to control flights involving a group of spacecraft. "In the not-too-distant future, space stations will appear near the Earth, and supply spaceships will ply between them and the ground," Prof Ivanchenko said.

Arrows to Ukraine

Disappointing weather did not dampen the crowd's reaction

25 YEARS AGO

to the Red Arrows' show. Natalia Skofenko, managing editor

of Radio Kiev, summed it up: "The show is magnificent in itself, but to our people it is a symbol of freedom. This is our first vision of the new Europe."

100-YEAR ARCHIVE

Every issue of *Flight* from 1909 onwards can be viewed online at flightglobal.com/archive

EDITORIAL, ADVERTISING, PRODUCTION & READER CONTACTS

EDITORIAL +44 20 8652 3842

Quadrant House, The Quadrant,
Sutton, Surrey, SM2 5AS, UK
flight.international@flightglobal.com

Editor Craig Hoyle
+44 20 8652 3834 craig.hoyle@flightglobal.com
Deputy Editor Dominic Perry
+44 20 8652 3206 dominic.perry@flightglobal.com
Head of Strategic Content Murdo Morrison FRAeS
+44 20 8652 4395 murdo.morrison@flightglobal.com
Features Editor Dan Thisdell
+44 20 8652 4491 dan.thisdell@flightglobal.com
Business & General Aviation Editor Kate Sarsfield
+44 20 8652 3885 kate.sarsfield@flightglobal.com
Aerospace and Defence Reporter Beth Stevenson
+44 20 8652 4382 beth.stevenson@flightglobal.com
Consulting Editor David Learmount
+44 7785 901787 david.learmount@entworld.com
Magazine Enquiries Dawn Hartwell
+44 20 8652 3315 dawn.hartwell@flightglobal.com

AIR TRANSPORT TEAM

Editor Flightglobal Premium News Graham Dunn
+44 20 8652 4995 graham.dunn@flightglobal.com
Managing Editor Niall O'Keeffe
+44 20 8652 4007 niall.okeeffe@flightglobal.com
Air Transport Editor David Kaminski-Morrow
+44 20 8652 3909 david.kaminski-morrow@flightglobal.com
Air Transport/MRO Reporter Michael Gubisch
+44 20 8652 8747 michael.gubisch@flightglobal.com
Senior Reporter Oliver Clark
+44 20 8652 8534 oliver.clark@flightglobal.com

AMERICAS

Americas Managing Editor Stephen Trimble
+1 703 836 8052 stephen.trimble@flightglobal.com
Deputy Americas Editor - Air Transport Ghim-Lay Yeo
+1 703 836 9474 ghimlay.yeo@flightglobal.com
Air Transport Reporter Edward Russell
+1 703 836 1897 edward.russell@flightglobal.com
Air Transport Reporter Jon Hemmerdinger
+1 703 836 3084 jon.hemmerdinger@flightglobal.com
Aviation Reporter James Drew
+1 703 836 7442 james.drew@flightglobal.com

ASIA/PACIFIC

Asia Editor Greg Waldron
+65 6780 4314 greg.waldron@flightglobal.com
Asia Air Transport Editor Mavis Toh
+65 6780 4309 mavis.toh@flightglobal.com
Asia Finance Editor Ellis Taylor
+65 6780 4307 ellis.taylor@flightglobal.com
Reporter Aaron Chong
+65 6780 4851 aaron.chong@flightglobal.com

EUROPE/MIDDLE EAST

Israel Correspondent Arie Egozi

FLIGHTGLOBAL.COM

Editor Stuart Clarke
+44 20 8652 3835 stuart.clarke@flightglobal.com
Web co-ordinator Rebecca Springate
+44 20 8652 4641 rebecca.springate@flightglobal.com

EDITORIAL PRODUCTION

Head of Design & Production Alexis Rendell
Global Chief Copy Editor Lewis Harper
Chief Copy Editor, Europe Dan Bloch
Layout Copy Editors Sophia Huang, Tim Norman
Global Production Editor Louise Murrell
Deputy Global Production Editor Rachel Warner
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Senior Designer Lauren Mills
Consulting Technical Artist Tim Hall

DISPLAY ADVERTISEMENT SALES

Quadrant House, The Quadrant,
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Global Sales Manager Mark Hillier
+44 20 8652 8022 mark.hillier@flightglobal.com
Key Account Manager Grace Hewitt
+44 20 8652 3469 grace.hewitt@flightglobal.com
Sales Support Gillian Cumming
+44 20 8652 8837 gillian.cumming@rbi.co.uk

NORTH & SOUTH AMERICA

Vice-President, North & South America
Rob Hancock +1 703 836 7444
robert.hancock@flightglobal.com
Regional Sales Director
Warren McEwan +1 703 836 3719
warren.mcewan@flightglobal.com
Sales Executive Kaye Woody
+1 703 836 7445 kaye.woody@flightglobal.com
Reed Business Information, 333 N. Fairfax Street,
Suite 301, Alexandria, VA 22314, USA

ITALY

Sales Manager Riccardo Laureri
+39 (02) 236 2500 media@laurerassociates.it
Laureri Associates SRL, Via Vallazze 43,
20131 Milano, Italy

ISRAEL

Sales Executive Asa Talbar +972 77 562 1900
Fax: +972 77 562 1903 talbar@talbar.co.il
Talbar Media, 41 HaGiva'a St, PO Box 3184, Givat
Ada 37808, Israel

ASIA/AUSTRALASIA

Key Account Manager Jay Ee
+65 6780 4301 jay.ee@flightglobal.com
Fax: +65 6789 7575
1 Changi Business Park Crescent,
#06-01 Plaza 8 @ CBP, Singapore 486025

RUSSIA & CIS

Director Arkady Komarov
komarov@worldbusinessmedia.ru
Tel/Fax: +7 (495) 987 3800
World Business Media, Leningradsky Prospekt, 80,
Korpus G, Office 807, Moscow 125190, Russia

CLASSIFIED & RECRUITMENT

Sales Manager Sophie Wild
sophie.wild@rbi.co.uk
Recruitment & Classified Key Account
Executive Katie Mann
+44 20 8652 4900
Recruitment.services@rbi.co.uk
Recruitment & Classified Sales Executive
Stuart Lee +44 20 8652 4900
Classified.services@rbi.co.uk
Key Account Manager - Asia Jay Ee
+65 6780 4301

ADVERTISEMENT PRODUCTION

Production Manager Sean Behan
+44 20 8652 8232 sean.behan@rbi.co.uk
Production Manager Classified Alan Blagrove
+44 20 8652 4406 alan.blagrove@rbi.co.uk

MARKETING

Marketing Director Justine Gillen
+44 20 8652 8031 justine.gillen@flightglobal.com

DATA TEAM

Head of Data Pete Webber
+44 20 8564 6715
peter.webber@flightglobal.com
Commercial Aviation Steven Phipps
+44 20 8564 6797
steven.phipps@flightglobal.com
Fleet Research Manager John Maloney
+44 20 8564 6704
john.maloney@flightglobal.com

PUBLISHING MANAGEMENT

Chief Operating Officer
Philippa Edward
Executive Director Content
Max Kingsley-Jones
max.kingsley-jones@flightglobal.com
Publisher Stuart Burgess
stuart.burgess@flightglobal.com

READER SERVICES

Subscriptions

Jenny Smith
Flight International
Subscriptions, Reed Business Information,
PO Box 302, Haywards Heath,
West Sussex, RH16 3DH, UK



Subscription Enquiries

From UK: 0330 333 9533
From overseas: +44 1444 475 682
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flightglobalevents.com/APS15



29-30 September
New Generation of Airline
Passenger Systems
London, UK
flightglobalevents.com/pss2015

1 October
US Corporate Aviation Summit
Fort Lauderdale, Florida
aeropodium.com/uscas

1-2 October
Central Asian Aviation Symposium
Almaty, Kazakhstan
aeropodium.com/caa

6-8 October
Helitech International
ExCel, London, UK
helitechevents.com

14-15 October
Aerospace Innovation Forum
Palais des Congrès, Bordeaux, France
www.aerospace-innovation-forum.com

20-21 October
The Commercial UAV Show
ExCel, London, UK
terrinn.com/exhibition/
the-commercial-uav-show

8-12 November
Dubai Airshow
Dubai World Central
dubaiirshow.aero

15-17 November
ALTA Airline Leaders Forum
San Juan, Puerto Rico
alta.aero/airlineleaders/2015

17-19 November
NBAA 2015
Las Vegas, USA
nbaa.org/events/bace/2015

17-19 November
Aerospace & Defense Meetings Torino
Torino, Italy
bciaerospace.com/turin

19-20 November
Safety In African Aviation
Kigali, Rwanda
2gether4safety.org

1-2 December
Military Airlift & Rapid Reaction Ops
Seville, Spain
smi-online.co.uk/defence/europe

8-10 December
Aerospace Meetings Brazil
São Paulo, Brazil
bciaerospace.com/brazil

3-4 February 2016
Aircraft Interiors Middle East
Dubai World Trade Centre, UAE
aime.aero/welcome-to-aime-2016

16-21 February 2016
Singapore Air Show
Changi Exhibition Centre, Singapore
singaporeairshow.com

18-21 April 2016
Defence Services Asia
Putra World Trade Centre, Kuala Lumpur
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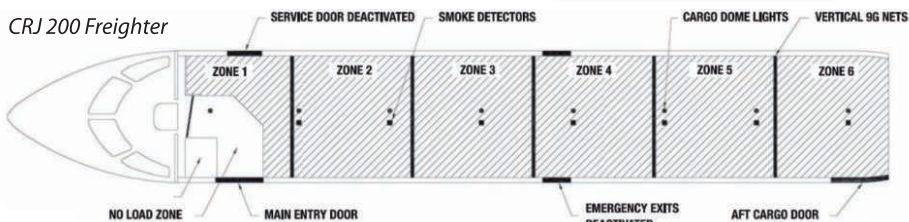
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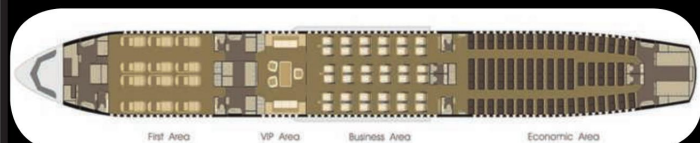
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«Präzision kann man am besten aus der Natur lernen. Dort ist alles bis ins kleinste Detail miteinander verknüpft.»

Kornelia Kunstmann,
Outdoorsportlerin und Projektmanagerin bei maxon motor

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WORK EXPERIENCE DANNI STONEY

Forging a career at the controls

Danni Stoney obtained her private pilot's licence at the age of 17, and is currently a first officer on an Embraer Phenom 300 managed by UK business aircraft charter and management company London Executive Aviation

What sparked your interest in flying?

I realised I wanted to be a pilot on my 15th birthday. My parents suggested a trial flying lesson as a present and I was immediately hooked. Following the flight, I spent most of my weekends at Newtownards airfield, in Northern Ireland, learning to fly in a Cessna 152.

When I turned 17, I obtained my private pilot's licence, becoming the youngest pilot in Ireland at that time.

Why did you decide to pursue a career as a pilot?

I absolutely loved flying and could think of nothing better as a career. However, I thought it was important to go to university and decided to complete a degree in mechanical engineering at the University of Edinburgh.

While studying, I took the opportunity to join the University Air Squadron and this gave me the chance to complete its elementary flying training course, which included aerobatics, formation and low-level flying.

I then went to Oxford Aviation Academy and finished my Airline Transport Pilot Licence training.

I was very fortunate to train on the Embraer Phenom 100 while working in sales and operations at a business aviation company. This gave me a much wider understanding of the business and commercial aviation industry outside of just flying.



Stoney has a broad understanding of the commercial aviation industry

A very small percentage of pilots are female. Why do you think that is?

Growing up, I suppose being a pilot was perceived as a male-orientated career. I think that perception is changing, as I'm meeting an increasing number of fellow female pilots.

Flying is rewarding and exciting. I have never felt discriminated against and have always been welcomed. This is a demanding industry – regardless of whether you are male or female, you have to work just as hard.

What challenges do you face in your job?

I'm constantly adapting to different routes and destinations with changing schedules and

"This is a demanding industry – regardless of whether you are male or female, you have to work hard"

weather conditions. The variety from one day to the next can be extraordinary. However, I don't consider them challenges but more part of the excitement I get to experience as a part of my everyday life.

What do you enjoy most about your job?

I am now flying with London Executive Aviation as a first officer on a Phenom 300. I love the many fantastic destinations I

fly to and these include ones that many people may never get the chance to visit.

Recently I was in Iqaluit, Baffin Island, Canada, where, despite the -40°C wind-chill, we managed to find lots to do during our rest time. We went walking, built our first igloo, watched our first-ever ice hockey game and, last but not least, went husky sleighing across a frozen bay.

What advice would you give to someone looking for a career as a pilot?

Do your research, as there are many different paths, depending on your ultimate goal as a pilot. Be aware that the industry is always changing and you may have to adapt to that. This is a highly competitive career and you have to work very hard in a dynamic market.

But if you have a love for flying high and working hard, then you will not regret it!

Where do you see yourself 10 years from now?

I am hoping to continue to progress my career and become a captain on a larger aircraft, flying to even more exotic, far-flung destinations. ■



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